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Health Care Associated Infections in Colorado

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Health Care Associated Infections in Colorado

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Colorado Health Facility-Acquired Infections Advisory Committee

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EXECUTIVE SUMMARY

This report presents data on health care associated infections (HAI) reported by Colorado health facilities. HAI are infections that are not present or developing when a patient is admitted to a health care facility and include infections associated with surgeries, central lines and dialysis treatment. HAI can be devastating to patients and families causing a significant financial burden due to additional medications, treatments, procedures, lost wages, short- and long-term illnesses, as well as pain, suffering and death.¹ Recognizing the seriousness of HAI, Colorado passed the HAI Disclosure Law (House Bill 06-1045) in 2006. This statute requires acute care hospitals, rehabilitation hospitals, long term acute care hospitals, selected hospital units, ambulatory surgery centers and outpatient dialysis treatment centers to report designated HAI data as a condition of their state licensure.

This report was written to fulfill reporting requirements set forth in the Disclosure Law and is the seventh annual report published by the Colorado Department of Public Health and Environment's Health and Safety Data Services Section. It is submitted each year to the Colorado Legislature by January 15. The report presents information about HAI reporting requirements, processes and limitations; functions of implementing the Disclosure Law; and HAI data submitted by Colorado health care facilities on surgical site infections (SSI), central line associated bloodstream infections (CLABSI) and dialysis-related infections.

Key findings described in this report are summarized in Table 1 below and include the following:

- Most Colorado health facilities had HAI rates similar to national rates.
- Statewide aggregate SSI rates for colon surgeries and abdominal hysterectomies performed in hospitals were better than national rates.
- Statewide aggregate SSI rates for hernia repairs performed in ambulatory surgery centers have been better than national rates for the last three years.
- Breast surgeries performed in hospitals had worse SSI rates when compared to the nation.
- Ambulatory surgery centers traditionally report fewer infections than hospitals, likely due to reduced opportunity to conduct post surgical follow-up with patients and surgeons.
- Statewide aggregate CLABSI rates in adult critical care units were better than the national average. CLABSI rates for long-term acute care hospitals, rehabilitation hospitals and neonatal critical care units remained steady and were similar to national rates.
- Statewide, Colorado's aggregate dialysis access related bloodstream infection rates have been better than the national average for the last three reporting years.

TABLE 1: 2012-2013 Health Care Associated Infections Summary Table

Health Care Associated Infection Type	# Facilities Reporting Data	# Facilities Reporting Zero Infections	# Facilities Better than National Rate	# Facilities Worse than National Rate	Comparison State to National Rate
Surgical Site Infections in Hospitals					
<u>Procedure Type</u>					
Breast Procedure	61	16	0	2	Worse
Coronary Artery Bypass	17	7	2	0	Same
Colon Procedure	54	3	3	0	Better
Hip Replacement	58	12	0	1	Same
Knee Replacement	58	21	1	1	Same
Abdominal Hysterectomy	55	9	0	0	Better
Vaginal Hysterectomy	55	19	0	1	Same
Surgical Site Infections in Ambulatory Surgery Centers					
<u>Procedure Type</u>					
Breast Procedure	32	15	0	0	Same
Hernia Repair	34	20	0	0	Better
Hip Replacement	1	1	0	0	Same
Knee Replacement	3	3	0	0	Same
Vaginal Hysterectomy	5	*	*	*	***
Central Line Associated Bloodstream Infections					
<u>Unit Type</u>					
All Units Combined	103	57	4	1	Better
Adult Critical Care Units	61	28	2	1	Better
Neonatal Critical Care Units	17	11	0	0	Same
Long Term Acute Care Hospitals	9	3	2	0	Same
Inpatient Rehabilitation Hospitals or Wards	16	15	0	0	Same
Dialysis Related Infections					
<u>Infection Type</u>					
Access Related Bloodstream Infections	70	6	4	1	Better
Local Access Infections	70	6	National rate not yet available		

* Infection data suppressed for all 5 facilities because each performed fewer than 20 procedures a year.

*** Indicates value not shown due to suppression of infection data, no National or historical rate available, or expected infection count of zero.

While this report only includes information on a subset of HAIs, the information provided can be used as an important indicator of health care quality and infection prevention efforts in Colorado facilities. Beyond the number and rate of HAI for each facility, consumers can see the volume of procedures performed at each facility, which can be an indicator of experience and practice.

The Colorado Department of Public Health and Environment’s Health and Safety Data Services Section will continue its work to reduce HAI in Colorado through various activities, including the tracking and publishing of HAI data, completion of HAI data validation studies, implementation of HAI prevention collaboratives, maintenance of communication vehicles for HAI related information and collaboration with internal and external partners committed to patient safety. It is hoped health care facilities will use the data in this report to target and improve infection prevention efforts and consumers will use the data to make informed health care choices.

Health Facility-Acquired Infections Report

Overview of HAI Reporting

INTRODUCTION

Health care associated infections (HAI) are infections that are not present or developing when a patient is admitted to a health care facility. They include infections associated with surgeries, central lines and dialysis treatment. HAI can be devastating to patients and families causing significant financial burden due to additional medications, treatments, procedures, lost wages, short- and long-term illnesses, as well as pain, suffering and death.¹ Colorado recognizes the seriousness of this public health threat and passed HAI reporting legislation in 2006. Colorado's HAI Disclosure Law (House Bill 06-1045) requires hospitals, including acute care, rehabilitation, and long term acute care hospitals, hospital units, ambulatory surgery centers and dialysis treatment centers to report designated HAI data as a condition of state licensure.

The Disclosure Law mandates that health facilities report their HAI data through the National Health Care Safety Network (NHSN),² a national web-based surveillance and reporting system managed by the Centers for Disease Control and Prevention (CDC). The use of NHSN potentially improves the validity of reported HAI data because facilities must use standard definitions and reporting rules. Reporting consistency allows facility HAI data to be compared to national rates and be more easily understood by health care facilities and the public.

As consumer demand for HAI related information has increased, policymakers nationwide have acknowledged the need for publishing HAI data in consumer-focused health care quality reports. This report is the seventh annual report published by the Colorado Department of Public Health and Environment's Health and Safety Data Services Section (formerly known as the Patient Safety Program) and is due to the Health and Human Services Committees of the Colorado Senate and House of Representatives on Jan. 15, 2014.

The report presents information about HAI reporting requirements, processes and limitations; functions of implementing the Disclosure Law; and HAI data submitted by Colorado health care facilities on surgical site infections (SSI), central line associated bloodstream infections (CLABSI) and dialysis-related infections. The SSI data presented in this report occurred in patients having surgeries anytime from Aug.1, 2010 through July 31, 2013. The CLABSI and dialysis-related infections presented in the report occurred in patients who received medical treatment from Aug. 1, 2010 through July 31, 2013.

HAI DISCLOSURE LAW IMPLEMENTATION

Implementing Colorado’s HAI Disclosure Law involves four main functions, as described below:

1. Appointment and coordination of an HAI advisory committee;
2. Selection of clinical metrics;
3. Oversight and validation of data entered into NHSN, and;
4. Reporting results.

1: APPOINTMENT AND COORDINATION OF AN HAI ADVISORY COMMITTEE

Colorado’s Disclosure Law requires the department’s executive director to appoint an 11-member HAI advisory committee, the Colorado Health Facility-Acquired Infections Advisory Committee, with the following composition: one representative each from a public and private hospital; a representative of a health insurer; a consumer/purchaser of health insurance; a representative of a health consumer organization; four infection control practitioners (one from a stand-alone ambulatory surgery center (ASC) and three infection preventionists board certified in infection control and epidemiology); a board certified or board eligible physician who is licensed in Colorado, affiliated with a Colorado hospital or medical school, and an active member of a national organization specializing in health care epidemiology or infection control; and a Master or PhD level medical statistician or clinical microbiologist.

The committee’s mission is to provide oversight of legislatively mandated HAI reporting to ensure accountability and improvement of patient health care through education, validation of data and review of reporting requirements and surveillance practices. The committee’s goals are to:

- Ensure all components of the Colorado Disclosure Law are implemented;
- Provide guidance in selecting HAI reporting metrics;
- Evaluate relevancy, accuracy of reporting requirements;
- Establish priorities for completing data validation studies;
- Provide input on outreach activities, research projects and other HAI-related projects as needed;
- Provide guidance regarding the Annual Report and other reports developed for consumers and health care personnel, and;
- Promote safe health care for Colorado citizens.

Advisory Committee Members

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2. **Dawn Benham**, RN, BSN, CIC
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3. **Colleen Casaceli**, BSN, MPH, CIC
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10. **Ryan Biehle**
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2: SELECTION OF CLINICAL METRICS

The HAI reporting metrics selected include infections related to central lines, surgeries and outpatient dialysis treatment. Central line-associated bloodstream infections (CLABSI) are associated with the presence of central lines in patients. A central line is an intravascular catheter (tube in a vein) that terminates at or close to the heart or in one of the great vessels (i.e., aorta, superior vena cava). Central lines, which may be temporary or permanent, are used to infuse fluids, withdraw blood or monitor fluid volume in patients. The surgeries for which surgical site infections (SSI) are reported were selected based on their high volume and risk for infection. Dialysis related infections include bloodstream infections and localized infections of the vascular access site. Dialysis is a method for removing waste products and fluid from a patient’s blood when the kidneys are failing. Because of frequent hospitalizations and weakened immune systems, dialysis patients are at high risk for infection. Table 2 below depicts Colorado’s selected reporting metrics.

In selecting metrics, the following factors were considered:³

- Impact – extent to which the infection affects the patient or family (disability, mortality and economic costs);
- Improvability – extent to which reporting infection improves practice to prevent the infection;
- Inclusiveness – range of individuals affected by the infection type (e.g., age, gender, socioeconomic status and ethnicity/race);
- Frequency – how often the infection occurs;
- Feasibility – ability for the data to be collected with minimal burden on the facilities;
- Functionality – extent to which the intended audience (patients, care providers and hospital administrators) can understand and apply the results.

TABLE 2: Colorado Health Care Associated Infection Reporting Metrics

Facility Type	Reported HAI	Reporting Hospital Unit(s)
Acute Care and Critical Access Hospitals	<ul style="list-style-type: none"> • Breast Surgical Site Infections (SSI) • Colon SSI • Coronary Bypass Graft SSI • Hip Replacement SSI • Knee Replacement SSI • Hysterectomy Abdominal SSI • Hysterectomy Vaginal SSI 	Inpatient and Outpatient Surgical Wards
		Adult Critical Care Units
	<ul style="list-style-type: none"> • Central Line Associated Bloodstream Infections (CLABSI) 	Neonatal Critical Care Units Level II/III and III
		Inpatient Rehabilitation Units
Rehabilitation Hospitals	<ul style="list-style-type: none"> • CLABSI 	Facility Wide
Long Term Acute Care Hospitals	<ul style="list-style-type: none"> • CLABSI 	Facility Wide
Ambulatory Surgery Centers	<ul style="list-style-type: none"> • Breast SSI • Hernia Repair SSI • Knee Replacement SSI • Hysterectomy Vaginal SSI 	Not Applicable
Outpatient Dialysis Centers	<ul style="list-style-type: none"> • Dialysis Events 	Not Applicable

3: OVERSIGHT AND VALIDATION OF DATA ENTERED INTO NHSN

Colorado health facilities grant the Colorado Department of Public Health and Environment access to the data they enter into the NHSN so the department can monitor, analyze and produce public reports. The NHSN maintains stringent controls to ensure data security, integrity and confidentiality, and also has the capacity to enable facilities to share data in a timely manner with each other and with public health agencies.

Colorado's Disclosure Law requires health facilities to report HAI data within 30 days of each month's end, and the department provides guidance and technical assistance to ensure the timely and accurate reporting of data. The department also performs systematic monitoring and validation of the HAI data submitted, which allows for the identification and correction of incomplete and incorrectly entered data. The department has completed data validation studies for CLABSI, SSI and dialysis-related infections and will conduct validation studies of additional infections as funding and staffing permit. See appendix A for a description of validation studies and HAI prevention projects completed or underway.

The Disclosure Law also specifies requirements for health care facility employees who collect and report HAI data. These individuals must be certified in infection control and epidemiology⁴ or become certified within six months of becoming eligible to take the certification exam. These certification requirements do not apply to staff in hospitals with 50 beds or less, dialysis centers or ASC. However, staff members in these facilities must complete specified NHSN educational programs before enrolling in NHSN, complete 10 hours of relevant infection prevention education annually and maintain a log of the completed education.

4: REPORTING RESULTS

The final function of implementation is the publication of annual public reports and semi-annual bulletins. The current report is the seventh annual report published by the department. Semi-annual bulletins provide additional data, research, and information applicable to HAI in Colorado. All HAI reports and bulletins can be found at www.healthfacilities.info by clicking on the following tabs: Health Care Associated Infections, Health and Safety Data Services, HAI Surveillance Data and Reports.

PARTICIPATING FACILITIES

There are currently 279 hospitals, hospital units, ambulatory surgery centers (ASC), and outpatient dialysis treatment clinics targeted for infection reporting. Of those, 75 hospitals, 9 long term acute care hospitals (LTAC), 5 rehabilitation hospitals, 51 ASC and 70 dialysis treatment clinics reported infection data this past year. Certain hospitals and ASC did not report HAI to the department because they did not perform reportable procedures. Table 3 shows the number of hospitals that report CLABSI by type of critical care unit and Table 4 lists Colorado's reportable surgical procedures and the numbers of hospitals and ASC that report them.

TABLE 3: Number of Hospitals Reporting Central Line Associated Bloodstream Infections (CLABSI) by Type of Critical Care Unit

Critical Care Unit	Number of Hospitals
Medical	6
Surgical	1
Medical/Surgical	43
Cardiothoracic surgery	2
Burn	1
Trauma	3
Neurosurgical	4
Level II/III Neonatal Critical Care	12
Level III Neonatal Critical Care	5
Long-term Acute Care Hospitals	9
Inpatient Rehabilitation Hospitals	5
Inpatient Rehabilitation Hospital Units	11

TABLE 4: Number of Hospitals and Ambulatory Surgery Centers Performing Reportable Procedures

Procedure	Hospitals	Ambulatory Surgical Center	Total
Breast Surgery	61	32	93
Colon Surgery	54	0 ²	54
Coronary Artery Bypass Graft	17	0 ²	17
Hernia Repair	NA ¹	34	34
Hip Replacement	58	1	59
Knee Replacement	58	3	61
Hysterectomy Abdominal	55	1	56
Hysterectomy Vaginal	55	5	60

¹ Hospitals no longer report hernia repairs.

² Ambulatory Surgery Centers do not perform these procedures.

Health Facility-Acquired Infections Report

Infection Data

INFECTION DATA FORMAT AND CAUTIONS

Data presented in this report cover SSI in patients undergoing surgeries from Aug. 1, 2010 through July 31, 2013, and for CLABSI and dialysis-related infections, patients receiving medical care from Aug. 1, 2010 through July 31, 2013. Two forms of HAI data are presented: infection rates that are combined over all Colorado facilities (aggregate data) and infection rates for each individual facility (facility-specific data). The report further classifies HAI data by procedure and/or by device so that facilities can readily identify areas in need of process improvements and target infection prevention efforts.

The following tables of data include the facility name and city, and for each facility, the number of infections and depending on the type of infection, the number of surgeries (for SSI), patient line days (for CLABSI) or patient months (for dialysis-related infections). In addition, the CLABSI and dialysis tables show infection rates, which are based on the number of infections observed and the denominator, either central line days for CLABSI or patient months for dialysis-related infections.

SSI tables show a standardized infection ratio (SIR), which is a summary measure that describes a facility's performance, while taking into account the risk of the facility's patient population. The SIR is a ratio that compares a facility's observed number of infections to the expected number of infections based on the national average (as determined by historical data collected by the NHSN). A SIR of 1.0 means that a facility's observed number of infections is equal to the expected number of infections. If the SIR value is greater than 1.0, there are more infections than expected, and if the SIR is less than 1.0, there are fewer infections than expected.

National Comparison. Regardless of type of infection, each facility shows a National Comparison, which represents how the facility's observed number of infections compares to the expected number of infections based on the national rate, denominator size (i.e., number of procedures, number of patient months, etc.) and a statistical test of difference between numerical values. The statistical test, known as a Poisson test, calculates the magnitude of difference between a facility's observed and expected number of infections. If there is no significant difference between the facility's HAI count and the expected count, the facility's infection rate is designated as "**SAME.**" If the difference is statistically significant and the SIR is greater than 1, the facility has significantly more infections than expected and is designated as "**WORSE.**" If the difference is statistically significant and the SIR is less than 1, the facility has significantly fewer HAI than expected and is designated as "**BETTER.**" For a more detailed explanation of how the SIR is calculated, see Appendix B.

Cautions. The Colorado Department of Public Health and Environment and the HAI Advisory Committee recommend caution be used when drawing conclusions from these data for multiple reasons. For one, direct comparisons between facilities may not provide the most accurate assessment because infection rates are influenced by the types of patients treated. Facilities that treat higher volumes of severely ill patients may have higher infection rates regardless of their prevention efforts. While the NHSN system provides the best risk adjustment possible to account for this at present, there always will be patient risk factors that cannot be measured (e.g., individual ability to heal, smoking cessation days), especially in severely ill patients with higher risks of infection.

Second, NHSN surveillance manuals are developed by CDC subject matter experts. Although the definitions and criteria are updated each year, they can be challenging to apply to patients with

complicated medical histories. Additionally, facilities use different surveillance techniques to find infections. Some infection preventionists have more resources for surveillance, thus may find and report more infections than other facilities. In those cases, higher infection rates may be based on better surveillance practices rather than poor infection control practices.

Finally, users of this report should note that the data presented are self-reported by each facility and that data validation studies only have been completed thus far for selected CLABSI, SSI and dialysis related infections. It is recommended that conclusions regarding health care quality be made in conjunction with other quality indicators and that consumers consult with doctors, health care facilities, health insurance carriers, health care websites from reputable sources (e.g., Hospital Compare, Colorado Hospital Report Card, Leap Frog), and with their families and friends before deciding where to receive care. It is hoped that facilities will use the data in this report to target and improve infection prevention efforts and that consumers will use the data to make more informed health care decisions.

COLORADO AGGREGATE HEALTH CARE-ACQUIRED INFECTION DATA

AGGREGATE SURGICAL SITE INFECTION DATA

Table 5 below shows aggregate SSI infection counts and SIRs for reportable procedures by three separate reporting years from Aug. 1, 2010 through July 31, 2013. SSI data are presented for both hospitals and ASC.

When combined statewide, Colorado hospitals had the same or better SSI rates than national rates for all surgeries except breast procedures. The reporting of breast procedures began in August 2011, and for the past two years, Colorado hospitals as a whole performed worse than the national average. In general, ASC reported lower rates of SSI than hospitals and as a whole, performed the same or better than national averages. Breast and hernia surgeries were the most common procedure reported by ASC, and the SSI rates for breast surgeries were the same as the national average; for hernia repairs, ASC SSI rates were better than national averages. For the remaining procedures reported by ASC (hip and knee prostheses and vaginal hysterectomies) zero infections were reported across all three years.

Colorado hospitals had the same or better SSI rates than national rates for all surgeries except breast procedures. ASC reported lower rates of SSI than hospitals and as a whole, performed the same or better than national averages.

AGGREGATE CLABSI DATA

Statewide, Colorado facilities have had CLABSI rates the same or better than national averages. When combined over all unit types, Colorado CLABSI rates have been better than the national average for all three years.

Table 6 shows aggregate CLABSI central line days, infection counts and rates for adult critical care units, neonatal critical care units, long-term acute care hospitals, rehabilitation hospitals and rehabilitation wards in Colorado from Aug. 1, 2010 through July 31, 2013.

Statewide, Colorado facilities have had CLABSI rates the same or better than national averages. When combined over all unit types, Colorado CLABSI rates have been better than the national average for all three years.

AGGREGATE DIALYSIS INFECTION DATA

Table 7 shows aggregated data for access-related bloodstream infections (ARB) in Colorado outpatient dialysis centers from Aug. 1, 2010 through July 31, 2013 and for local access infections (LAI) from Aug. 1, 2011 through July 31, 2013.

Dialysis ARB rates have been better than national rates for the last three reporting years.

Dialysis ARB rates have been better than national rates for the last three reporting years. While the statewide LAI rate is 1.3 per 100 patient months, national LAI rates are not yet available to provide comparisons.

TABLE 5: Colorado Aggregate **Surgical Site Infections** for **Hospitals** and **Ambulatory Surgery Centers**

Facility Type and Procedure	August 2010- July 2011				August 2011- July 2012				August 2012- July 2013			
	Procedure Count	Infection Count	SIR	National Comparison	Procedure Count	Infection Count	SIR	National Comparison	Procedure Count	Infection Count	SIR	National Comparison
Hospitals:												
Breast Surgery	Reporting began August 2011				9,162	94	1.4	Worse	9,744	101	1.4	Worse
Coronary Artery Bypass Graft	1,598	39	1.3	Same	1,531	26	0.9	Same	1,508	19	0.7	Same
Colon Surgery	Reporting began August 2012				2619	107	0.7	Better	4,556	191	0.7	Better
Hernia	11,106	107	1.0	Same	7,019	56	0.8	Same	No longer required to report			
Hip Replacement	7,404	87	1.0	Same	8,244	86	0.9	Same	8,337	87	0.9	Same
Knee Replacement	12,198	117	1.0	Same	12,055	103	0.9	Same	12,234	99	0.8	Same
Abdominal Hysterectomy	4,754	67	0.9	Same	5,217	60	0.7	Better	6,422	70	0.6	Better
Vaginal Hysterectomy	4,635	47	1.3	Same	4,303	45	1.3	Same	2,992	23	0.9	Same
Ambulatory Surgery Centers:												
Breast Surgery	Reporting began August 2011				5,752	19	0.7	Same	5,714	17	0.6	Same
Hernia	5,639	14	0.5	Better	5,681	15	0.6	Better	5,564	9	0.3	Better
Hip Replacement	143	0	0	Same	169	0	0	Same	200	0	0	Same
Knee Replacement	363	0	0	Same	366	0	0	Same	469	0	0	Same
Vaginal Hysterectomy	34	0	***	***	36	0	***	***	42	0	***	***

*** Indicates value not shown due to suppression of infection data, no National or historical rate available, or an expected infection count of zero.

TABLE 6: Colorado Aggregate **Central Line Associated Bloodstream Infections (CLABSI)** by Unit Type

Unit Type	August 2010- July 2011				August 2011- July 2012				August 2012- July 2013			
	Central Line Days	CLABSI Count	CLABSI Rate*	National Comparison	Central Line Days	CLABSI Count	CLABSI Rate*	National Comparison	Central Line Days	CLABSI Count	CLABSI Rate*	National Comparison
All Units Combined	165,506	155	0.9	Better	179,861	172	1.0	Better	173,606	147	0.8	Better
Adult Critical Care Unit	96,625	85	0.9	Same	110,923	112	1.0	Same	109,142	90	0.8	Better
Neonatal Critical Care Unit	21,311	26	1.2	Same	18,643	20	1.1	Same	17,842	20	1.1	Same
Long-Term Acute Care Facility	47,202	44	0.9	Same	44,205	38	0.9	Better	38,465	35	0.9	Same
Inpatient Rehab Facility/Ward	Reporting began August 2011				6,043	2	0.3	Same	8,157	2	0.2	Same

* Per 1,000 Central Line Days

TABLE 7: Colorado Aggregate **Dialysis Infections** by Infection Type

Dialysis Center and Region	August 2010- July 2011				August 2011- July 2012				August 2012- July 2013			
	Number of Patients	Infection Count	Rate	National Comparison	Number of Patients	Infection Count	Rate	National Comparison	Number of Patients	Infection Count	Rate	National Comparison
Access-Related Bloodstream Infection	39,628	237	0.6	Better	39,889	223	0.6	Better	39,858	224	0.6	Better
Local Access Infection	LAI reporting definition changed during this year				39,889	357	0.9	NA	39,858	531	1.3	NA

NA=No national rates are available for local access infections at this time.

COLORADO FACILITY SPECIFIC HEALTH CARE-ACQUIRED INFECTION DATA - SURGICAL SITE INFECTION OVERVIEW

Surgical site infections (SSI) are infections directly related to a surgical procedure. It is estimated that more than 20 percent of HAI are attributed to SSI, equating to infections in approximately two percent of all surgical procedures nationally.⁵ The impact from an SSI can be devastating, often leading to a longer hospital stay, additional treatment and higher costs.⁶ The economic toll per patient occurrence is estimated to be between \$3,000 and \$25,500 depending on the procedure and pathogen(s) involved.^{1,7} Overall in the United States, SSI can cost consumers and health care payers from 3 to 10 billion dollars each year.¹

Surgical procedures required for SSI reporting are selected because they are (1) performed at a high volume, (2) performed at a variety of facilities, and (3) associated with a high risk for SSI. The surgeries monitored for SSI in Colorado include cardiac procedures, hip and knee replacements, hernia repairs, hysterectomies (abdominal and vaginal), and breast and colon procedures. The NHSN manual defines reportable procedures for surveillance as those that occur in a single trip to an operating room where the incision is closed following the procedure.² Surgeries are performed as either inpatient or outpatient procedures.

Reportable infections occur within 30 days of the procedure or within one year if an implant was placed during the procedure. Common signs of infection include fever, pain or tenderness, drainage from the incision site, redness, or presence of an abscess. In NHSN, SSI are classified into three different categories based on the location of the infection.

- Superficial incision infection, which involves only the top layers of the skin.
- Deep incision, which involves deeper soft tissues (e.g., fascia and muscle layers).
- Organ space, which involves any part of the body that is opened or manipulated during the surgical procedure, excluding the top layers of skin, fascia or muscle layers.

Every table presenting SSI data below lists each facility in Colorado that performed the designated procedure, its city, the number of procedures performed, number of infections, standardized infection ratio (SIR) and a comparison to national infection data. For a detailed explanation of how the SIR is calculated, see Appendix B. There are three categories that indicate how a facility's own infection rate compares to the national infection rate. These are:

1. Statistically fewer (**better**) infections than expected based on national infection rates;
2. Statistically similar (**same**) infections as expected based on the national infection rates; or
3. Statistically more (**worse**) infections than expected based on national infection rates.

CARDIAC PROCEDURES

BACKGROUND

A heart bypass, also known as a coronary artery bypass graft, is a surgery used to bypass blocked heart arteries by creating new passages for blood to flow to the heart muscle. Arteries or veins from other parts of the body are used as grafts to create alternative blood-flow pathways. There are two types of coronary artery bypass graft surgeries: one that has both chest and donor site incisions (CBGB) and one that uses a chest incision only (CBGC). Both types involve replacing damaged sections of one or more coronary arteries with undamaged arteries or veins such as the internal mammary artery (thoracic) and saphenous vein (leg) to increase cardiac blood flow. The majority of cardiac operative procedures performed in Colorado hospitals are CBGB. Based on the small number of CBGC surgeries performed, most SSI data associated with CBGC had to be suppressed to protect confidential health information and therefore, CBGC data are not presented in this report.

Seventeen hospitals reported 1,508 CBGB surgeries this past year; seven hospitals reported zero SSI. Two hospitals had CBGB SSI rates better than the national average; all other hospitals' rates were similar to the national rate.

RESULTS

Table 8 shows facility specific data for SSI attributed to CBGB surgeries performed in hospitals from Aug. 1, 2012 through July 31, 2013. Historical data for two previous reporting years are also provided.

Seventeen hospitals reported a total of 1,508 CBGB surgeries this past year and seven hospitals reported zero SSI. Two hospitals had CBGB SSI rates better than the national average; all other hospitals' rates were similar to the national rate.

TABLE 8: Coronary Artery Bypass Grafts with Chest and Donor Site Incisions in Hospitals, Aug. 1, 2010 – July 31, 2013

Surgical Site Infections in Coronary Artery Bypass Grafts With Chest And Donor Site Incisions: Aug. 1, 2010 – July 31, 2013													
Health Facility and City		August 2010- July 2011				August 2011- July 2012				August 2012- July 2013			
		Procedure Count	Infection Count	SIR	National Comparison	Procedure Count	Infection Count	SIR	National Comparison	Procedure Count	Infection Count	SIR	National Comparison
Boulder Community Hospital	Boulder	51	0	0	Same	65	1	0.8	Same	54	0	0	Same
Centura Penrose St Francis Health	Colorado Springs	186	7	2.2	Same	219	4	1.1	Same	182	3	1.0	Same
Centura Porter Adventist Hospital	Denver	94	6	3.7	Worse	110	4	2.4	Same	91	1	0.7	Same
Centura St Anthony Hospital	Lakewood	66	0	0	Same	71	1	0.6	Same	64	0	0	Same
Exempla Lutheran MC	Wheat Ridge	64	1	0.8	Same	89	0	0	Same	87	0	0	Same
Exempla St Joseph Hospital	Denver	135	1	0.4	Same	166	1	0.3	Same	213	0	0	Better
Longmont United Hospital	Longmont	31	1	1.2	Same	15	***	***	***	0	***	***	***
MC of Aurora	Aurora	85	1	0.6	Same	65	0	0	Same	58	3	2.4	Same
MC of the Rockies	Loveland	151	3	0.8	Same	150	4	1.1	Same	168	0	0	Better
Memorial Hospital Central	Colorado Springs	262	6	1.5	Same	151	0	0	Same	168	2	0.8	Same
North Colorado MC	Greeley	76	2	1.4	Same	67	3	2.4	Same	54	3	2.9	Same
Parkview MC	Pueblo	54	1	1.0	Same	60	3	2.6	Same	55	0	0	Same
Presbyterian St Luke's MC	Denver	23	0	0	Same	13	***	***	***	15	***	***	***
Rose MC	Denver	14	***	***	***	19	***	***	***	15	***	***	***
Sky Ridge MC	Lone Tree	36	2	2.7	Same	16	***	***	***	22	0	0	Same
St Mary's Hospital	Grand Junction	135	1	0.5	Same	123	1	0.5	Same	111	2	1.2	Same
Swedish MC	Englewood	75	3	2.6	Same	54	2	2.4	Same	56	2	2.2	Same
University of Colorado Hospital	Aurora	60	3	2.7	Same	78	1	0.6	Same	96	2	0.9	Same

Note: MC=Medical Center; SIR=Standardized Infection Ratio, the ratio of observed to expected infections adjusted for procedure risk factors.

National comparison based on the indirect adjustment of modeled risk factors for each procedure type.

*** Indicates value not shown due to suppression of infection data, no national or historical rate available, or an expected infection count of zero.

Infections for facilities performing less than 20 procedures per year are suppressed to protect confidential health information. These facilities fulfilled reporting requirements.

Source: National Health Care Safety Network (NHSN) Database.

ORTHOPEDIC PROCEDURES

BACKGROUND

A total or partial hip replacement is a surgery for people with severe hip damage or pain related to chronic osteoarthritis, rheumatoid arthritis, or other degenerative processes involving the hip joint. The surgical procedure for a hip replacement (HR) involves removing the damaged cartilage and bone from the hip joint and replacing them with an artificial device. The procedure consists of placing a cup, which is typically plastic, ceramic or metal, to replace the hip socket, a metal or ceramic ball to replace the head of the thighbone, and a metal stem to attach to the bone.

A total or partial knee replacement (KR) is a surgery for people with severe knee damage and pain related to osteoarthritis, rheumatoid arthritis or traumatic arthritis. A total knee replacement involves removing the damaged cartilage and bone from the surface of the knee joint and replacing them with an artificial device. In this procedure, the patella (kneecap) is removed, the femur (thigh bone) and tibia (shin bone) are cut down, and a metal, ceramic or plastic prosthesis is put in place.

Fifty-eight hospitals reported 8,337 HR procedures this past year. One hospital had a HR SSI rate worse than the national average; all other hospitals had HR SSI rates similar to the national average.

RESULTS

Tables 9 and 10 show facility specific data for SSI attributed to hip and knee procedures performed in hospitals (inpatient and outpatient) and ASC (outpatient only) from Aug. 1, 2012 through July 31, 2013. Historical data for two previous reporting years are also provided.

Fifty-eight hospitals reported 8,337 HR procedures this past year, 12 of which reported zero HR SSI. One hospital had a HR SSI rate worse than the national average; all other hospitals had HR SSI rates similar to the national average.

Only one ASC reported HR procedures this past year. Of 200 HR procedures performed at that ASC, zero infections were reported.

Fifty-eight hospitals reported 12,234 KR procedures this past year; 21 reported zero KR SSI. One hospital had a KP SSI rate better than the national average and one hospital's rate was worse.

Fifty-eight hospitals reported 12,234 KR procedures this past year; 21 reported zero KR SSI. One hospital had a KR SSI rate better than the national average, one hospital's rate was worse, and all others were similar to the national average.

Three ASC reported 469 KR procedures this year, all three of which reported zero infections.

TABLE 9: Hip Replacement (Total or Partial) in Hospitals and Ambulatory Surgery Centers (ASC), Aug 1, 2010 – July 31, 2013

Surgical Site Infections in Hip Replacement Procedures in Hospitals and Ambulatory Surgery Centers: Aug. 1, 2010 – July 31, 2013													
Health Facility and City		August 2010- July 2011				August 2011- July 2012				August 2012- July 2013			
		Procedure Count	Infection Count	SIR	National Comparison	Procedure Count	Infection Count	SIR	National Comparison	Procedure Count	Infection Count	SIR	National Comparison
Animas Surgical Hospital	Durango	47	0	0	Same	47	0	0	Same	70	0	0	Same
Arkansas Valley Regional MC	La Junta	12	***	***	***	18	***	***	***	11	***	***	***
Aspen Valley Hospital	Aspen	3	***	***	***	9	***	***	***	50	0	0	Same
Boulder Community Hospital	Boulder	350	2	0.6	Same	321	4	1.3	Same	242	1	0.4	Same
Centura Avista Adventist Hospital	Louisville	126	3	2.6	Same	113	1	1.0	Same	99	4	4.0	Worse
Centura Littleton Adventist Hospital	Littleton	141	3	1.7	Same	104	1	0.7	Same	114	0	0	Same
Centura Penrose St Francis Health	Colorado Springs	414	8	1.7	Same	522	3	0.5	Same	478	1	0.2	Same
Centura Porter Adventist Hospital	Denver	514	11	2.1	Worse	574	7	1.3	Same	618	5	0.9	Same
Centura St Anthony Hospital	Lakewood	203	1	0.4	Same	145	4	1.9	Same	148	2	0.8	Same
Centura St Anthony North Hospital	Westminster	61	0	0	Same	66	1	1.2	Same	103	3	2.4	Same
Centura St Francis MC	Colorado Springs	125	1	0.7	Same	117	2	1.3	Same	134	2	1.3	Same
Centura St Mary Corwin MC	Pueblo	103	2	1.5	Same	144	3	1.5	Same	124	1	0.6	Same
Centura St Thomas More Hospital	Canon City	62	4	5.2	Worse	41	2	4.3	Same	39	1	2.0	Same
Colorado Plains MC	Fort Morgan	12	***	***	***	25	0	0	Same	32	0	0	Same
Community Hospital	Grand Junction	78	3	2.6	Same	79	0	0	Same	62	1	1.2	Same
Delta County Memorial Hospital	Delta	57	0	0	Same	62	2	2.6	Same	54	1	1.4	Same
Denver Health MC	Denver	99	1	0.7	Same	113	2	1.1	Same	111	4	1.9	Same
East Morgan County Hospital	Brush	18	***	***	***	9	***	***	***	0	***	***	***
Estes Park MC	Estes Park	0	***	***	***	7	***	***	***	10	***	***	***
Exempla Good Samaritan MC	Lafayette	241	0	0	Same	313	0	0	Better	298	5	1.3	Same
Exempla Lutheran MC	Wheat Ridge	224	5	2.1	Same	170	6	2.5	Same	160	6	2.3	Same
Exempla St Joseph Hospital	Denver	503	4	0.7	Same	705	4	0.5	Same	671	4	0.5	Same
Family Health West Hospital	Grand Junction	3	***	***	***	2	***	***	***	1	***	***	***
Grand River MC	Rifle	7	***	***	***	5	***	***	***	10	***	***	***
Gunnison Valley Hospital	Gunnison	3	***	***	***	1	***	***	***	6	***	***	***
Heart of the Rockies Regional MC	Salida	12	***	***	***	10	***	***	***	21	0	0	Same

Surgical Site Infections in Hip Replacement Procedures in Hospitals and Ambulatory Surgery Centers: Aug. 1, 2010 – July 31, 2013

Health Facility and City		August 2010- July 2011				August 2011- July 2012				August 2012- July 2013			
		Procedure Count	Infection Count	SIR	National Comparison	Procedure Count	Infection Count	SIR	National Comparison	Procedure Count	Infection Count	SIR	National Comparison
Longmont United Hospital	Longmont	105	1	0.6	Same	121	0	0	Same	133	1	0.5	Same
McKee MC	Loveland	134	0	0	Same	161	2	1.2	Same	149	1	0.6	Same
MC of Aurora	Aurora	173	3	1.5	Same	179	3	1.3	Same	259	4	1.3	Same
MC of the Rockies	Loveland	84	1	1.0	Same	107	0	0	Same	134	4	2.5	Same
Memorial Hospital Central	Colorado Springs	383	3	0.7	Same	308	1	0.3	Same	251	1	0.4	Same
Memorial Hospital North	Colorado Springs	97	1	0.9	Same	135	1	0.8	Same	131	1	0.8	Same
Mercy Regional MC	Durango	83	2	2.1	Same	94	0	0	Same	75	0	0	Same
Montrose Memorial Hospital	Montrose	54	1	1.4	Same	67	0	0	Same	68	0	0	Same
North Colorado MC	Greeley	150	1	0.4	Same	146	3	1.6	Same	184	0	0	Same
North Suburban MC	Thornton	62	0	0	Same	64	0	0	Same	89	1	0.8	Same
OrthoColorado Hospital at St. Anthony Medical Campus	Lakewood	286	2	0.9	Same	387	4	1.2	Same	454	1	0.2	Same
Orthopedic Center of the Rockies ASC	Ft Collins	142	0	0	Same	169	0	0	Same	200	0	0	Same
Parker Adventist Hospital	Parker	62	1	1.2	Same	103	2	1.6	Same	132	2	1.0	Same
Parkview MC	Pueblo	202	1	0.4	Same	208	4	1.4	Same	215	2	0.6	Same
Pikes Peak Regional Hospital	Woodland Park	4	***	***	***	7	***	***	***	4	***	***	***
Platte Valley MC	Brighton	11	***	***	***	10	***	***	***	14	***	***	***
Poudre Valley Hospital	Ft Collins	497	2	0.4	Same	561	2	0.3	Same	481	4	0.7	Same
Presbyterian St Luke's MC	Denver	249	1	0.3	Same	321	2	0.6	Same	366	2	0.5	Same
Rocky Mountain Surgery Center ASC	Englewood	1	***	***	***	1	***	***	***	0	***	***	***
Rose MC	Denver	332	0	0	Same	342	3	0.8	Same	304	3	1.0	Same
San Luis Valley Regional MC	Alamosa	21	0	0	Same	26	1	2.9	Same	34	0	0	Same
Sky Ridge MC	Lone Tree	442	7	1.4	Same	636	8	1.2	Same	798	12	1.5	Same
Southwest Memorial Hospital	Cortez	36	0	0	Same	22	1	3.7	Same	15	***	***	***
St Anthony Summit MC	Frisco	2	***	***	***	1	***	***	***	1	***	***	***
St Mary's Hospital	Grand Junction	259	3	1.1	Same	263	0	0	Same	275	1	0.3	Same
Sterling Regional MC	Sterling	40	0	0	Same	36	0	0	Same	30	2	4.6	Same
Swedish MC	Englewood	224	2	0.7	Same	280	5	1.4	Same	273	1	0.3	Same
The Children' Hospital	Aurora	9	***	***	***	33	0	0	Same	19	***	***	***
The Memorial Hospital	Craig	1	***	***	***	7	***	***	***	1	***	***	***
University of Colorado Hospital	Aurora	206	6	2.8	Worse	252	1	0.3	Same	261	3	0.8	Same

Surgical Site Infections in Hip Replacement Procedures in Hospitals and Ambulatory Surgery Centers: Aug. 1, 2010 – July 31, 2013													
Health Facility and City		August 2010- July 2011				August 2011- July 2012				August 2012- July 2013			
		Procedure Count	Infection Count	SIR	National Comparison	Procedure Count	Infection Count	SIR	National Comparison	Procedure Count	Infection Count	SIR	National Comparison
Vail Valley MC	Vail	37	0	0	Same	11	***	***	***	7	***	***	***
Valley View Hospital	Glenwood Springs	73	0	0	Same	58	0	0	Same	41	0	0	Same
Wray Community Hospital	Wray	6	***	***	***	6	***	***	***	10	***	***	***
Yampa Valley MC	Steamboat Springs	47	0	0	Same	74	0	0	Same	58	0	0	Same

Note: MC=Medical Center; SIR=Standardized Infection Ratio, the ratio of observed to expected infections adjusted for procedure risk factors. National comparison based on the indirect adjustment of modeled risk factors for each procedure type.

*** Indicates value not shown due to suppression of infection data, no national or historical rate available, or an expected infection count of zero.

Infections for facilities performing less than 20 procedures per year are suppressed to protect confidential health information. These facilities fulfilled reporting requirements.

Source: National Health Care Safety Network (NHSN) Database.

TABLE 10: Knee Replacement (Total or Partial) in Hospitals and Ambulatory Surgery Centers (ASC), Aug. 1, 2010 – July 31, 2013

Surgical Site Infections in Knee Replacement Procedures in Hospitals (In- and Outpatient Combined): Aug. 1, 2010 – July 31, 2013													
Health Facility and City		August 2010- July 2011				August 2011- July 2012				August 2012- July 2013			
		Procedure Count	Infection Count	SIR	National Comparison	Procedure Count	Infection Count	SIR	National Comparison	Procedure Count	Infection Count	SIR	National Comparison
Animas Surgical Hospital	Durango	81	0	0	Same	115	0	0	Same	128	0	0	Same
Arkansas Valley Regional MC	La Junta	44	0	0	Same	36	0	0	Same	21	0	0	Same
Aspen Valley Hospital	Aspen	28	0	0	Same	27	0	0	Same	65	1	1.9	Same
Boulder Community Hospital	Boulder	256	2	0.8	Same	265	5	2.1	Same	246	0	0	Same
Centura Avista Adventist Hospital	Louisville	156	1	0.8	Same	168	1	0.8	Same	159	3	2.5	Same
Centura Littleton Adventist Hospital	Littleton	146	0	0	Same	141	1	0.6	Same	177	0	0	Same
Centura Penrose St Francis Health	Colorado Springs	447	3	0.7	Same	477	5	1.1	Same	453	2	0.5	Same
Centura Porter Adventist Hospital	Denver	979	7	0.8	Same	972	7	0.8	Same	1,077	6	0.6	Same
Centura St Anthony Hospital	Lakewood	285	0	0	Same	138	3	2	Same	130	0	0	Same
Centura St Anthony North Hospital	Westminster	80	2	2.8	Same	77	1	1.3	Same	90	2	2.5	Same
Centura St Francis MC	Colorado Springs	295	3	1.1	Same	243	8	3.2	Worse	317	0	0	Same
Centura St Mary Corwin MC	Pueblo	214	3	1.5	Same	210	1	0.5	Same	222	2	1.0	Same
Centura St Thomas More Hospital	Canon City	79	1	1.6	Same	72	1	1.7	Same	73	0	0	Same
Colorado Plains MC	Fort Morgan	31	0	0	Same	56	0	0	Same	52	1	2.3	Same
Community Hospital	Grand Junction	124	2	1.6	Same	131	1	0.7	Same	117	0	0	Same
Delta County Memorial Hospital	Delta	101	2	2.4	Same	112	0	0	Same	77	0	0	Same
Denver Health MC	Denver	126	5	3.9	Worse	133	2	1.4	Same	133	0	0	Same
Durango at Mercy MC ASC	Durango	1	***	***	***	0	***	***	***	0	***	***	***
East Morgan County Hospital	Brush	15	***	***	***	14	***	***	***	0	***	***	***
Estes Park MC	Estes Park	0	***	***	***	8	***	***	***	2	***	***	***
Exempla Good Samaritan MC	Lafayette	446	1	0.3	Same	517	3	0.6	Same	492	3	0.7	Same
Exempla Lutheran MC	Wheat Ridge	323	3	1.0	Same	116	2	1.6	Same	122	1	0.8	Same
Exempla St Joseph Hospital	Denver	657	5	0.8	Same	828	3	0.4	Same	895	3	0.3	Better
Family Health West Hospital	Grand Junction	1	***	***	***	9	***	***	***	2	***	***	***
Grand River MC	Rifle	9	***	***	***	8	***	***	***	2	***	***	***
Gunnison Valley Hospital	Gunnison	4	***	***	***	3	***	***	***	7	***	***	***

Surgical Site Infections in Knee Replacement Procedures in Hospitals (In- and Outpatient Combined): Aug. 1, 2010 – July 31, 2013

Health Facility and City		August 2010- July 2011				August 2011- July 2012				August 2012- July 2013			
		Procedure Count	Infection Count	SIR	National Comparison	Procedure Count	Infection Count	SIR	National Comparison	Procedure Count	Infection Count	SIR	National Comparison
Heart of the Rockies Regional MC	Salida	40	2	5.6	Same	15	***	***	***	50	0	0	Same
Kremmling Memorial Hospital	Kremmling	1	***	***	***	1	***	***	***	1	***	***	***
Longmont Surgery Center ASC	Longmont	0	***	***	***	1	***	***	***	0	***	***	***
Longmont United Hospital	Longmont	218	0	0	Same	243	2	0.9	Same	248	0	0	Same
Loveland Surgery Center ASC	Loveland	2	***	***	***	2	***	***	***	0	***	***	***
McKee MC	Loveland	290	1	0.4	Same	285	3	1.4	Same	300	2	0.9	Same
MC of Aurora	Aurora	341	8	2.2	Same	296	2	0.6	Same	358	6	1.5	Same
MC of the Rockies	Loveland	87	0	0	Same	116	1	0.6	Same	151	4	2.2	Same
Memorial Hospital Central	Colorado Springs	638	1	0.1	Better	487	1	0.2	Same	358	4	1.2	Same
Memorial Hospital North	Colorado Springs	328	4	1.4	Same	393	3	0.9	Same	364	5	1.6	Same
Mercy Regional MC	Durango	114	0	0	Same	149	0	0	Same	164	1	0.8	Same
Montrose Memorial Hospital	Montrose	141	0	0	Same	140	0	0	Same	135	1	1.0	Same
North Colorado MC	Greeley	286	3	0.9	Same	306	5	1.4	Same	282	1	0.3	Same
North Suburban MC	Thornton	174	2	1.3	Same	151	1	0.7	Same	145	5	3.1	Same
OrthoColorado Hospital at St. Anthony Medical Campus	Lakewood	604	3	0.7	Same	885	2	0.3	Same	1,043	11	1.4	Same
Orthopaedic Center of the Rockies ASC	Ft Collins	329	0	0	Same	349	0	0	Same	408	0	***	***
Parker Adventist Hospital	Parker	163	3	2.1	Same	167	0	0	Same	200	2	0.7	Same
Parkview MC	Pueblo	361	6	1.5	Same	364	9	2.3	Worse	335	2	0.5	Same
Pikes Peak Regional Hospital	Woodland Park	32	0	0	Same	44	0	0	Same	27	0	0	Same
Platte Valley MC	Brighton	48	0	0	Same	66	2	3.9	Same	63	3	6.0	Worse
Poudre Valley Hospital	Ft Collins	991	5	0.5	Same	977	4	0.4	Same	988	7	0.7	Same
Presbyterian St Luke's MC	Denver	373	4	1.0	Same	360	1	0.3	Same	354	4	1	Same
Rocky Mountain Surgery Center ASC	Englewood	9	***	***	***	5	***	***	***	0	***	***	***
Rose MC	Denver	532	4	0.8	Same	555	5	0.9	Same	595	3	0.5	Same
San Luis Valley Regional MC	Alamosa	42	1	2.7	Same	25	0	0	Same	38	1	2.7	Same
Sky Ridge MC	Lone Tree	806	15	1.9	Worse	715	5	0.7	Same	737	6	0.9	Same
Skyline Surgery Center ASC	Loveland	7	***	***	***	5	***	***	***	0	***	***	***
Southwest Memorial Hospital	Cortez	48	0	0	Same	55	0	0	Same	25	1	5.0	Same

Surgical Site Infections in Knee Replacement Procedures in Hospitals (In- and Outpatient Combined): Aug. 1, 2010 – July 31, 2013													
Health Facility and City		August 2010- July 2011				August 2011- July 2012				August 2012- July 2013			
		Procedure Count	Infection Count	SIR	National Comparison	Procedure Count	Infection Count	SIR	National Comparison	Procedure Count	Infection Count	SIR	National Comparison
St Anthony Summit MC	Frisco	40	1	3.5	Same	65	0	0	Same	36	0	0	Same
St Mary's Hospital	Grand Junction	301	1	0.3	Same	332	1	0.3	Same	326	0	0	Same
Sterling Regional MC	Sterling	29	0	0	Same	45	0	0	Same	37	0	0	Same
Surgery Center At Lutheran ASC	Wheat Ridge	0	***	***	***	1	***	***	***	12	***	***	***
Surgical Center at Premier ASC	Colorado Springs	14	***	***	***	4	***	***	***	37	0	***	***
Swedish MC	Englewood	305	2	0.7	Same	324	2	0.6	Same	429	4	1.0	Same
The Children's Hospital	Aurora	2	***	***	***	8	***	***	***	5	***	***	***
The Memorial Hospital	Craig	1	***	***	***	29	0	0	Same	8	***	***	***
University of Colorado Hospital	Aurora	299	6	1.9	Same	327	8	1.8	Same	293	2	0.5	Same
Vail Valley MC	Vail	204	1	0.6	Same	132	0	0	Same	138	0	0	Same
Valley View Hospital	Glenwood Springs	123	1	1.0	Same	115	1	1.0	Same	91	0	0	Same
Wray Community Hospital	Wray	16	***	***	***	20	0	0	Same	19	***	***	***
Yampa Valley MC	Steamboat Springs	90	0	0	Same	110	1	1.0	Same	83	0	0	Same

Note: MC=Medical Center; SIR=Standardized Infection Ratio, the ratio of observed to expected infections adjusted for procedure risk factors.

National comparison based on the indirect adjustment of modeled risk factors for each procedure type.

*** Indicates value not shown due to suppression of infection data, no national or historical rate available, or an expected infection count of zero.

Infections for facilities performing less than 20 procedures per year are suppressed to protect confidential health information. These facilities fulfilled reporting requirements.

Source: National Health Care Safety Network (NHSN) Database.

ABDOMINAL PROCEDURES

BACKGROUND

The surgeries presented in this section are hernia repairs, colon surgeries and hysterectomies (abdominal and vaginal). These surgeries can be performed as inpatient or outpatient procedures.

A hernia procedure involves the repair of a hernia or bulging of internal organs or tissues that protrude through an abnormal opening in the muscle wall. Reportable NHSN hernia procedures include inguinal, femoral, umbilical or anterior abdominal wall repairs.

In Colorado, hernia repairs were removed from mandatory reporting in acute care hospitals based on new national reporting requirements by the Centers for Medicare and Medicaid Services (CMS). To fulfill CMS reimbursement requirements, facilities nationwide began reporting certain colon procedures on Jan. 1, 2012.

Since facilities already were reporting colon surgeries to fulfill CMS requirements, Colorado removed the mandatory reporting of hernia repairs in hospitals, replacing it with colon surgeries. Hernia repair remains a reportable surgery for ASC and colon procedures only are reportable for hospitals.

Colon surgeries involve the excision of abnormal tissue in the small and large intestines. The intestines, which are muscular tubes that extend from the end of the stomach to the rectum, carry food, products of digestion and bacteria that help break down food in the digestive process. Since the intestines house bacteria, colon surgeries have a high risk for contamination and infection.

Hysterectomies are reported both by hospitals and ASC and involve the surgical removal of the uterus and occasionally, one or both fallopian tubes and/or ovaries. Indications for hysterectomy typically include benign fibroid tumors, cancerous tumors, uterine prolapse (uterus slips down into the vagina), endometriosis (cells from the uterine lining grow outside the uterus, causing pain and bleeding) and chronic pelvic pain.

Procedures counts, SSI counts and SSI rates for hernia repairs, colon surgeries and hysterectomies are presented in Tables 11-14 below.

HERNIA REPAIR

Hernia procedures involve the repair of bulging internal organs or tissues that protrude through an abnormal opening in the muscle wall. Reportable NHSN hernia procedures include inguinal, femoral, umbilical or anterior abdominal wall repairs. Since January 2012, hospitals no longer are required to report hernia repairs; therefore, hernia repairs are only reported for ambulatory surgery centers (ASC).

RESULTS

Table 11 shows facility specific data for SSI attributed to **hernia repairs** performed in ASC from Aug. 1, 2012 through July 31, 2013, along with historical data for two previous reporting years.

Individually, all ASC had hernia SSI rates similar to the national average. When examining all ASC combined, the state aggregate had a better hernia SSI rate than the national average all three reporting years.

Thirty-four ASC reported 5,564 hernia repairs this past year; 20 ASC reported zero SSI. Individually, all ASC had hernia SSI rates similar to the national average. However, when examining all ASC combined (see Table 5), the statewide hernia SSI rate has been better than the national average all three reporting years.

TABLE 11: Hernia Repairs in Ambulatory Surgery Centers (ASC), Aug. 1, 2010 – July 31, 2013

Surgical Site Infections in Hernia Repairs in Ambulatory Surgery Centers (ASC): Aug. 1, 2010 – July 31, 2013													
Health Facility and City		August 2010- July 2011				August 2011- July 2012				August 2012- July 2013			
		Procedure Count	Infection Count	SIR	National Comparison	Procedure Count	Infection Count	SIR	National Comparison	Procedure Count	Infection Count	SIR	National Comparison
ASC Durango at Mercy MC	Durango	152	0	0	Same	146	0	0	Same	91	0	0	Same
Aberdeen Ambulatory Surgical Center	Pueblo	2	***	***	***	3	***	***	***	4	***	***	***
Arkansas Valley Surgery Center	Canon City	84	0	0	Same	82	0	0	Same	90	0	0	Same
Audubon Ambulatory Surgery Center	Colorado Springs	18	***	***	***	37	1	5.9	Same	18	***	***	***
Audubon Ambulatory Surgery Center at St. Francis	Colorado Springs	522	3	1.2	Same	560	3	1.1	Same	468	0	0	Same
Aurora Surgery Center	Aurora	26	0	0	Same	0	***	***	***	0	***	***	***
Black Canyon Surgical Center	Montrose	36	0	0	Same	39	0	0	Same	37	0	0	Same
Boulder MC	Boulder	68	0	0	Same	74	0	0	Same	0	***	***	***
Centrum Surgical Center	Greenwood Village	9	***	***	***	7	***	***	***	13	***	***	***
Children's North Surgery Center	Broomfield	51	0	0	Same	56	0	0	Same	73	0	0	Same
Clear Creek Surgery Center	Wheat Ridge	383	1	0.6	Same	385	2	1.1	Same	366	0	0	Same
Colorado Springs Surgery Center	Colorado Springs	1	***	***	***	1	***	***	***	0	***	***	***
Crown Point Surgery Center	Parker	310	1	0.7	Same	244	0	0	Same	308	0	0	Same
Denver Midtown Surgery Center	Denver	225	0	0	Same	273	0	0	Same	175	0	0	Same
First Choice Outpatient Surgery Center at Community Hospital	Grand Junction	121	1	1.7	Same	83	1	2.5	Same	78	1	2.8	Same
Grand Valley Surgical Center	Grand Junction	221	1	0.9	Same	213	1	0.9	Same	182	0	0	Same
Harmony Ambulatory Surgery Center	Ft Collins	490	1	0.4	Same	534	4	1.5	Same	486	2	0.9	Same
Kaiser Permanente Ambulatory Surgery Center	Denver	770	5	1.3	Same	681	1	0.3	Same	676	5	1.5	Same
Lincoln Surgery Center	Parker	73	0	0	Same	55	0	0	Same	55	0	0	Same
Longmont Surgery Center	Longmont	166	0	0	Same	152	0	0	Same	126	0	0	Same
MCR Surgery Center	Loveland	1	***	***	***	0	***	***	***	0	***	***	***
Midvalley Ambulatory Surgery Center LLC	Basalt	3	***	***	***	6	***	***	***	4	***	***	***
Minimally Invasive Spinal Institute	Lafayette	1	***	***	***	0	***	***	***	0	***	***	***

Surgical Site Infections in Hernia Repairs in Ambulatory Surgery Centers (ASC): Aug. 1, 2010 – July 31, 2013

Health Facility and City		August 2010- July 2011				August 2011- July 2012				August 2012- July 2013			
		Procedure Count	Infection Count	SIR	National Comparison	Procedure Count	Infection Count	SIR	National Comparison	Procedure Count	Infection Count	SIR	National Comparison
North Suburban Surgery Center	Thornton	108	0	0	Same	178	0	0	Same	192	0	0	Same
Parkwest Surgery Center	Pueblo	10	***	***	***	9	***	***	***	9	***	***	***
Peak One Surgery Center	Frisco	41	0	0	Same	71	2	6.1	Same	60	0	0	Same
Pueblo Surgery Center	Pueblo	14	***	***	***	18	***	***	***	7	***	***	***
Red Rocks Surgery Center	Golden	Not yet operating				115	0	0	Same	253	0	0	Same
Renewal Surgery Center	Lone Tree	7	***	***	***	1	***	***	***	3	***	***	***
Rocky Mountain Surgery Center	Englewood	371	1	0.6	Same	353	0	0	Same	278	0	0	Same
Rose Surgical Center	Denver	459	0	0	Same	417	0	0	Same	399	0	0	Same
Sky Ridge Surgical Center	Lone Tree	239	0	0	Same	221	0	0	Same	328	0	0	Same
Skyline Surgery Center	Loveland	142	0	0	Same	179	0	0	Same	128	0	0	Same
Southwest Colorado Surgical Center	Cortez	0	***	***	***	13	***	***	***	12	***	***	***
Summit View Surgery Center	Littleton	286	0	0	Same	321	0	0	Same	342	0	0	Same
Surgery Center At Lutheran	Wheat Ridge	130	0	0	Same	58	0	0	Same	5	***	***	***
Surgery Center At Printers Park	Colorado Springs	28	0	0	Same	15	***	***	***	132	1	1.6	Same
Surgery Center Of Ft Collins	Ft Collins	8	***	***	***	15	***	***	***	13	***	***	***
Surgical Center at Premier	Colorado Springs	63	0	0	Same	66	0	0	Same	83	0	0	Same

Note: MC=Medical Center; SIR=Standardized Infection Ratio, the ratio of observed to expected infections adjusted for procedure risk factors.

National comparison based on the indirect adjustment of modeled risk factors for each procedure type.

*** Indicates value not shown due to suppression of infection data, no national or historical rate available, or an expected infection count of zero.

Infections for facilities performing less than 20 procedures per year are suppressed to protect confidential health information. These facilities fulfilled reporting requirements.

Source: National Health Care Safety Network (NHSN) Database.

COLON SURGERIES

Colon surgeries involve the small and large intestines, muscular tubes that extend from the end of the stomach to the rectum. The intestines carry bacteria as part of the digestive process, and therefore have a high risk for contamination and infection. Facilities began reporting for certain colon procedures on Jan. 1, 2012, as part of the Centers for Medicare and Medicaid Services (CMS) reporting requirements.

When combining data across all Colorado hospitals, the statewide aggregate rate for colon SSI has been better than the national average in all reporting

RESULTS

Table 12 shows facility specific data for SSI attributed to **colon surgeries** performed from Jan. 1, 2012 through July 31, 2013.

Fifty-four hospitals reported 4,556 colon surgeries this past year and three hospitals reported zero SSI. Three hospitals had colon SSI rates better than the national average; all others had rates similar to the national average. When combining data across all Colorado hospitals (Table 5), the statewide aggregate rate for colon SSI has been better than the national average in all reporting periods.

TABLE 12: Colon Surgeries in Hospitals, Jan. 1, 2012 – July 31, 2013

Surgical Site Infections in Colon Procedures in Hospitals: Jan. 1, 2012 – July 31, 2013									
Health Facility and City		January-July 2012*				August 2012-July 2013			
		Procedure Count	Infection Count	SIR	National Comparison	Procedure Count	Infection Count	SIR	National Comparison
Arkansas Valley Regional MC	La Junta	8	***	***	***	12	***	***	***
Aspen Valley Hospital	Aspen	6	***	***	***	6	***	***	***
Boulder Community Hospital	Boulder	39	1	0.5	Same	74	5	1.1	Same
Boulder Community Hospital-Foothills	Boulder	2	***	***	***	10	***	***	***
Centura Avista Adventist Hospital	Louisville	18	***	***	***	39	2	0.9	Same
Centura Littleton Adventist Hospital	Littleton	60	2	0.6	Same	102	4	0.7	Same
Centura Penrose St Francis Health	Colorado Springs	145	5	0.6	Same	213	7	0.6	Same
Centura Porter Adventist Hospital	Denver	58	6	1.7	Same	82	4	0.9	Same
Centura St Anthony Hospital	Lakewood	63	4	1.0	Same	127	13	1.7	Same
Centura St Anthony North Hospital	Westminster	39	3	1.5	Same	75	4	1.0	Same
Centura St Francis MC	Colorado Springs	40	1	0.5	Same	68	2	0.6	Same
Centura St Mary Corwin MC	Pueblo	41	0	0	Same	52	4	1.3	Same
Centura St Thomas More Hospital	Canon City	25	0	0	Same	44	4	1.7	Same
Colorado Plains MC	Fort Morgan	14	***	***	***	19	***	***	***
Community Hospital	Grand Junction	21	0	0	Same	41	4	1.8	Same
Delta County Memorial Hospital	Delta	23	0	0	Same	28	2	1.2	Same
Denver Health MC	Denver	93	7	1.1	Same	146	18	1.6	Same
East Morgan County Hospital	Brush	2	***	***	***	0	***	***	***
Estes Park MC	Estes Park	2	***	***	***	0	***	***	***
Exempla Good Samaritan MC	Lafayette	120	6	0.9	Same	169	3	0.3	Better
Exempla Lutheran MC	Wheat Ridge	110	6	1.0	Same	152	5	0.6	Same
Exempla St Joseph Hospital	Denver	176	3	0.3	Better	362	17	0.9	Same
Grand River MC	Rifle	6	***	***	***	4	***	***	***
Gunnison Valley Hospital	Gunnison	2	***	***	***	0	***	***	***
Heart of the Rockies Regional MC	Salida	6	***	***	***	16	***	***	***
Longmont United Hospital	Longmont	69	6	1.7	Same	97	3	0.5	Same
McKee MC	Loveland	28	3	2.1	Same	76	2	0.5	Same
MC of Aurora	Aurora	60	2	0.6	Same	121	10	1.5	Same
MC of the Rockies	Loveland	66	0	0	Better	127	0	0	Better
Memorial Hospital Central	Colorado Springs	65	2	0.5	Same	142	6	0.7	Same
Memorial Hospital North	Colorado Springs	35	3	1.8	Same	56	0	0	Same
Mercy Regional MC	Durango	24	0	0	Same	45	0	0	Same

Surgical Site Infections in Colon Procedures in Hospitals: Jan. 1, 2012 – July 31, 2013									
Health Facility and City		January-July 2012*				August 2012-July 2013			
		Procedure Count	Infection Count	SIR	National Comparison	Procedure Count	Infection Count	SIR	National Comparison
Montrose Memorial Hospital	Montrose	21	0	0	Same	41	2	0.8	Same
Mt San Rafael Hospital	Trinidad	1	***	***	***	1	***	***	***
North Colorado MC	Greeley	105	5	0.8	Same	149	10	1.1	Same
North Suburban MC	Thornton	33	1	0.5	Same	61	1	0.3	Same
Pagosa Springs MC	Pagosa Springs	1	***	***	***	1	***	***	***
Parker Adventist Hospital	Parker	73	2	0.5	Same	128	4	0.5	Same
Parkview MC	Pueblo	89	4	0.9	Same	110	4	0.7	Same
Pikes Peak Regional Hospital	Woodland Park	5	***	***	***	8	***	***	***
Platte Valley MC	Brighton	18	***	***	***	33	4	2.1	Same
Poudre Valley Hospital	Ft Collins	106	5	0.9	Same	169	5	0.6	Same
Presbyterian St Luke's MC	Denver	69	1	0.3	Same	131	2	0.3	Same
Prowers MC	Lamar	1	***	***	***	1	***	***	***
Rose MC	Denver	93	4	0.9	Same	192	4	0.4	Same
San Luis Valley Regional MC	Alamosa	10	***	***	***	15	***	***	***
Sky Ridge MC	Lone Tree	81	6	1.4	Same	148	9	1.1	Same
Southwest Memorial Hospital	Cortez	16	***	***	***	16	***	***	***
St Anthony Summit MC	Frisco	6	***	***	***	6	***	***	***
St Mary's Hospital	Grand Junction	69	2	0.6	Same	183	3	0.3	Same
Sterling Regional MC	Sterling	6	***	***	***	17	***	***	***
Swedish MC	Englewood	173	12	1.3	Same	296	15	0.9	Same
The Children's Hospital	Aurora	25	0	0	Same	73	1	0.2	Same
University of Colorado Hospital	Aurora	112	1	0.1	Better	222	6	0.4	Better
Vail Valley MC	Vail	15	***	***	***	15	***	***	***
Valley View Hospital	Glenwood Springs	19	***	***	***	26	3	1.9	Same
Wray Community Hospital	Wray	3	***	***	***	0	***	***	***
Yampa Valley MC	Steamboat Springs	3	***	***	***	9	***	***	***

Note: MC=Medical Center; SIR=Standardized Infection Ratio, the ratio of observed to expected infections adjusted for procedure risk factors.

National comparison based on the indirect adjustment of modeled risk factors for each procedure type.

*Hospitals began reporting colon procedures January, 2012.

*** Indicates value not shown due to suppression of infection data, no national or historical rate available, or an expected infection count of zero.

Infections for facilities performing less than 20 procedures per year are suppressed to protect confidential health information. These facilities fulfilled reporting requirements.

Source: National Health Care Safety Network (NHSN) Database.

HYSTERECTOMIES

Hysterectomies have traditionally been performed by making a large abdominal incision to access the uterus and surrounding anatomy. This traditional, open abdominal surgery often causes significant pain, threat to surrounding organs and nerves, long recovery periods and a higher risk of bleeding and infection⁴. Based on these negative outcomes, surgeons began using less invasive techniques such as vaginal hysterectomies. In traditional vaginal hysterectomies, the procedure is completed through the vagina with no abdominal incisions. Compared to traditional, open abdominal hysterectomies, vaginal hysterectomies have been shown to result in fewer surgical complications and infections⁵. This report presents SSI for both abdominal and vaginal hysterectomies.

When numbers for all facilities are combined, the state's AHYS SSI rate has been better than the national average for the last two reporting years.

RESULTS

Tables 13 and 14 show facility specific data for SSI attributed to abdominal and vaginal hysterectomies performed from Aug. 1, 2010 through July 31, 2013.

The number of hospitals with VHYS SSI rates worse than the national average declined from five in 2010-2011 to one each year for the last two reporting years.

Fifty-five hospitals and one ASC reported 6,422 **abdominal hysterectomies (AHYS)** in this reporting period. Of those facilities, nine reported zero infections. Individually, all facilities had an AHYS SSI rate similar to the national average. However, when numbers for all facilities are combined (Table 5), the state's AHYS SSI rate has been better than the national average for the last two reporting years.

Fifty-five hospitals and five ASC reported 2,992 and 42 **vaginal hysterectomies (VHYS)**, respectively. SSI data for all five ASC were suppressed because they each reported performing fewer than 20 VHYS procedures per year. Of the 55 hospitals reporting VHYS, 19 reported zero VHYS SSI this past year. One hospital had a higher (worse) SSI rate than the national average and all others had rates similar to the national average. The number of hospitals with VHYS SSI rates worse than the national average declined from five in 2010-2011 to one for each of the last two reporting years.

Table 13: **Abdominal Hysterectomies in Hospitals**, Aug. 1, 2010 – July 31, 2013

Surgical Site Infections in Abdominal Hysterectomies in Hospitals (In- and Outpatient Combined): Aug. 1, 2010 – July 31, 2013													
Health Facility and City		August 2010- July 2011				August 2011- July 2012				August 2012- July 2013			
		Procedure Count	Infection Count	SIR	National Comparison	Procedure Count	Infection Count	SIR	National Comparison	Procedure Count	Infection Count	SIR	National Comparison
Animas Surgical Hospital	Durango	20	0	0	Same	17	***	***	***	11	***	***	***
Arkansas Valley Regional MC	La Junta	5	***	***	***	4	***	***	***	5	***	***	***
Aspen Valley Hospital	Aspen	8	***	***	***	3	***	***	***	6	***	***	***
Boulder Community Hospital	Boulder	4	***	***	***	17	***	***	***	36	1	1.6	Same
Boulder Community Hospital-Foothills	Boulder	32	1	1.7	Same	36	0	0	Same	19	***	***	***
Centura Avista Adventist Hospital	Louisville	45	1	1.2	Same	67	0	0	Same	49	3	2.8	Same
Centura Littleton Adventist Hospital	Littleton	76	0	0	Same	77	0	0	Same	153	1	0.4	Same
Centura Penrose St Francis Health	Colorado Springs	153	5	1.5	Same	189	8	2.0	Same	232	3	0.7	Same
Centura Porter Adventist Hospital	Denver	123	1	0.6	Same	165	0	0	Same	111	1	0.5	Same
Centura St Anthony Hospital	Lakewood	58	1	1.0	Same	18	***	***	***	27	0	0	Same
Centura St Anthony North Hospital	Westminster	22	0	0	Same	13	***	***	***	13	***	***	***
Centura St Francis MC	Colorado Springs	202	3	0.8	Same	224	2	0.5	Same	325	3	0.6	Same
Centura St Mary Corwin MC	Pueblo	44	0	0	Same	93	0	0	Same	145	1	0.4	Same
Centura St Thomas More Hospital	Canon City	25	0	0	Same	15	***	***	***	13	***	***	***
Colorado Plains MC	Fort Morgan	25	0	0	Same	40	0	0	Same	38	1	1.6	Same
Community Hospital	Grand Junction	7	***	***	***	17	***	***	***	13	***	***	***
Crown Point Surgery Center ASC	Parker	0	***	***	***	0	***	***	***	4	***	***	***
Delta County Memorial Hospital	Delta	22	0	0	Same	14	***	***	***	57	0	0	Same
Denver Health MC	Denver	52	0	0	Same	70	2	1.5	Same	70	1	0.6	Same
Estes Park MC	Estes Park	0	***	***	***	1	***	***	***	2	***	***	***
Exempla Good Samaritan MC	Lafayette	139	1	0.4	Same	174	2	0.8	Same	179	0	0	Same

Surgical Site Infections in Abdominal Hysterectomies in Hospitals (In- and Outpatient Combined): Aug. 1, 2010 – July 31, 2013

Health Facility and City		August 2010- July 2011				August 2011- July 2012				August 2012- July 2013			
		Procedure Count	Infection Count	SIR	National Comparison	Procedure Count	Infection Count	SIR	National Comparison	Procedure Count	Infection Count	SIR	National Comparison
Exempla Lutheran MC	Wheat Ridge	287	4	1.0	Same	302	7	1.6	Same	319	3	0.7	Same
Exempla St Joseph Hospital	Denver	234	5	1.1	Same	279	5	0.9	Same	453	10	1.0	Same
Grand River MC	Rifle	7	***	***	***	10	***	***	***	6	***	***	***
Gunnison Valley Hospital	Gunnison	16	***	***	***	15	***	***	***	5	***	***	***
Heart of the Rockies Regional MC	Salida	7	***	***	***	11	***	***	***	1	***	***	***
Longmont United Hospital	Longmont	59	1	1.1	Same	29	0	0	Same	149	2	0.8	Same
McKee MC	Loveland	47	1	1.4	Same	162	0	0	Same	233	0	0	Same
MC of Aurora	Aurora	82	1	0.7	Same	109	0	0	Same	96	1	0.7	Same
MC of the Rockies	Loveland	73	1	0.9	Same	61	0	0	Same	45	0	0	Same
Melissa Memorial	Holyoke	0	***	***	***	0	***	***	***	1	***	***	***
Memorial Hospital Central	Colorado Springs	220	10	3.2	Worse	162	3	1.2	Same	272	4	0.9	Same
Memorial Hospital North	Colorado Springs	216	1	0.4	Same	138	4	2.2	Same	131	0	0	Same
Mercy Regional MC	Durango	104	1	0.9	Same	103	0	0	Same	106	1	0.8	Same
Montrose Memorial Hospital	Montrose	69	0	0	Same	119	0	0	Same	120	2	1.3	Same
Mt San Rafael Hospital	Trinidad	3	***	***	***	1	***	***	***	6	***	***	***
North Colorado MC	Greeley	120	1	0.5	Same	167	2	0.9	Same	218	1	0.3	Same
North Suburban MC	Thornton	121	1	0.5	Same	154	2	0.8	Same	147	0	0	Same
Parker Adventist Hospital	Parker	92	3	1.8	Same	122	1	0.5	Same	130	1	0.5	Same
Parkview MC	Pueblo	116	3	1.8	Same	120	1	0.7	Same	125	0	0	Same
Pikes Peak Regional Hospital	Woodland Park	1	***	***	***	1	***	***	***	0	***	***	***
Platte Valley MC	Brighton	26	2	5.2	Same	22	1	3.2	Same	23	1	2.6	Same
Poudre Valley Hospital	Ft Collins	267	3	0.8	Same	252	2	0.5	Same	261	1	0.3	Same
Presbyterian St Luke's MC	Denver	50	0	0	Same	59	1	0.8	Same	64	2	1.6	Same
Prowers MC	Lamar	20	0	0	Same	31	0	0	Same	12	***	***	***
Rose MC	Denver	409	1	0.1	Better	392	6	1.0	Same	488	5	0.7	Same
San Luis Valley Regional MC	Alamosa	12	***	***	***	7	***	***	***	11	***	***	***
Sky Ridge MC	Lone Tree	193	2	0.6	Same	216	5	1.2	Same	406	6	0.8	Same
Southwest Memorial	Cortez	2	***	***	***	1	***	***	***	15	***	***	***

Surgical Site Infections in Abdominal Hysterectomies in Hospitals (In- and Outpatient Combined): Aug. 1, 2010 – July 31, 2013

Health Facility and City		August 2010- July 2011				August 2011- July 2012				August 2012- July 2013			
		Procedure Count	Infection Count	SIR	National Comparison	Procedure Count	Infection Count	SIR	National Comparison	Procedure Count	Infection Count	SIR	National Comparison
St Anthony Summit MC	Frisco	36	0	0	Same	24	0	0	Same	16	***	***	***
St Mary's Hospital	Grand Junction	174	1	0.3	Same	265	1	0.2	Same	298	1	0.2	Same
Sterling Regional MC	Sterling	6	***	***	***	5	***	***	***	1	***	***	***
Swedish MC	Englewood	460	6	0.8	Same	448	4	0.5	Same	537	7	0.8	Same
The Memorial Hospital	Craig	0	***	***	***	3	***	***	***	0	***	***	***
University of Colorado Hospital	Aurora	152	3	0.6	Same	197	0	0	Better	225	3	0.3	Same
Vail Valley MC	Vail	12	***	***	***	13	***	***	***	10	***	***	***
Valley View Hospital	Glenwood Springs	30	1	2.0	Same	14	***	***	***	13	***	***	***
Yampa Valley MC	Steamboat Springs	17	***	***	***	11	***	***	***	24	0	0	Same

Note: MC=Medical Center; SIR=Standardized Infection Ratio, the ratio of observed to expected infections adjusted for procedure risk factors.

National comparison based on the indirect adjustment of modeled risk factors for each procedure type.

*** Indicates value not shown due to suppression of infection data, no national or historical rate available, or an expected infection count of zero.

Infections for facilities performing less than 20 procedures per year are suppressed to protect confidential health information. These facilities fulfilled reporting requirements.

Source: National Health Care Safety Network (NHSN) Database.

TABLE 14: Vaginal Hysterectomies in Hospitals and Ambulatory Surgery Centers (ASC), Aug. 1, 2010 – July 31, 2013

Surgical Site Infections in Vaginal Hysterectomies in Hospitals and Ambulatory Surgery Centers (ASC), (In- and Outpatient Combined): Aug. 1, 2010 – July 31, 2013													
Health Facility and City		August 2010- July 2011				August 2011- July 2012				August 2012- July 2013			
		Procedure Count	Infection Count	SIR	National Comparison	Procedure Count	Infection Count	SIR	National Comparison	Procedure Count	Infection Count	SIR	National Comparison
Animas Surgical Hospital	Durango	49	0	0	Same	27	0	0	Same	29	0	0	Same
Aspen Valley Hospital	Aspen	18	***	***	***	18	***	***	***	13	***	***	***
Audubon Ambulatory Surgery Center ASC	Colorado Springs	0	***	***	***	1	***	***	***	1	***	***	***
Boulder Community Hospital	Boulder	63	1	2.8	Same	35	1	4.7	Same	1	***	***	***
Boulder Community Hospital-Foothills	Boulder	13	***	***	***	13	***	***	***	16	***	***	***
Centura Avista Adventist Hospital	Louisville	43	3	10.8	Worse	34	1	4.7	Same	37	0	0	Same
Centura Littleton Adventist Hospital	Littleton	181	2	2.0	Same	150	0	0	Same	80	0	0	Same
Centura Penrose St Francis Health	Colorado Springs	58	1	3.7	Same	78	2	5.2	Same	30	0	0	Same
Centura Porter Adventist Hospital	Denver	131	0	0	Same	121	2	3.0	Same	75	1	2.4	Same
Centura St Anthony Hospital	Lakewood	12	***	***	***	0	***	***	***	3	***	***	***
Centura St Anthony North Hospital	Westminster	79	0	0	Same	62	0	0	Same	29	0	0	Same
Centura St Francis MC	Colorado Springs	183	5	5.5	Worse	303	3	1.8	Same	138	1	1.4	Same
Centura St Mary Corwin MC	Pueblo	57	0	0	Same	62	0	0	Same	23	0	0	Same
Centura St Thomas More Hospital	Canon City	22	1	7.5	Same	13	***	***	***	34	0	0	Same
Colorado Plains MC	Fort Morgan	13	***	***	***	22	0	0	Same	19	***	***	***
Colorado Springs Surgery Center ASC	Colorado Springs	10	***	***	***	0	***	***	***	0	***	***	***
Community Hospital	Grand Junction	82	2	5.4	Same	80	1	2.5	Same	58	0	0	Same
Crown Point Surgery Center ASC	Parker	5	***	***	***	0	***	***	***	0	***	***	***
Delta County Memorial Hospital	Delta	29	1	6.7	Same	22	0	0	Same	7	***	***	***
Denver Health MC	Denver	60	0	0	Same	59	3	3.9	Same	65	1	1.0	Same
Estes Park MC	Estes Park	0	***	***	***	7	***	***	***	10	***	***	***
Exempla Good Sam	Lafayette	131	1	1.6	Same	138	2	2.7	Same	115	1	1.6	Same

Surgical Site Infections in Vaginal Hysterectomies in Hospitals and Ambulatory Surgery Centers (ASC), (In- and Outpatient Combined): Aug. 1, 2010 – July 31, 2013

Health Facility and City		August 2010- July 2011				August 2011- July 2012				August 2012- July 2013			
		Procedure Count	Infection Count	SIR	National Comparison	Procedure Count	Infection Count	SIR	National Comparison	Procedure Count	Infection Count	SIR	National Comparison
Exempla Lutheran MC	Wheat Ridge	173	0	0	Same	188	3	2.9	Same	164	0	0	Same
Exempla St Joseph Hospital	Denver	327	0	0	Better	311	1	0.2	Same	216	3	0.9	Same
Grand River MC	Rifle	17	***	***	***	11	***	***	***	31	0	0	Same
Gunnison Valley Hospital	Gunnison	0	***	***	***	0	***	***	***	5	***	***	***
Heart of the Rockies Regional MC	Salida	0	***	***	***	2	***	***	***	3	***	***	***
Longmont United Hospital	Longmont	87	1	2.2	Same	82	1	2.1	Same	33	1	4.7	Same
McKee MC	Loveland	238	3	2.0	Same	119	1	1.4	Same	2	***	***	***
MC of Aurora	Aurora	116	1	1.5	Same	88	0	0	Same	49	2	6.9	Same
MC of the Rockies	Loveland	16	***	***	***	11	***	***	***	9	***	***	***
Memorial Hospital Central	Colorado Springs	340	6	3.3	Worse	205	1	0.9	Same	176	0	0	Same
Memorial Hospital North	Colorado Springs	209	5	4.1	Worse	195	2	2.0	Same	188	1	1.0	Same
Mercy Regional MC	Durango	22	0	0	Same	27	0	0	Same	16	***	***	***
Montrose Memorial Hospital	Montrose	44	1	4.1	Same	34	0	0	Same	24	0	0	Same
Mt San Rafael Hospital	Trinidad	1	***	***	***	9	***	***	***	10	***	***	***
North Colorado MC	Greeley	178	0	0	Same	154	1	1.2	Same	66	0	0	Same
North Suburban MC	Thornton	46	0	0	Same	69	0	0	Same	25	0	0	Same
Pagosa Springs MC	Pagosa Springs	0	***	***	***	0	***	***	***	1	***	***	***
Parker Adventist	Parker	59	0	0	Same	67	4	10.1	Worse	102	1	1.5	Same
Parkview MC	Pueblo	202	1	0.4	Same	200	0	0	Same	200	0	0	Same
Peak One Surgery Center ASC	Frisco	0	***	***	***	13	***	***	***	14	***	***	***
Pikes Peak Regional Hospital	Woodland Park	6	***	***	***	6	***	***	***	1	***	***	***
Platte Valley MC	Brighton	18	***	***	***	31	0	0	Same	33	3	17.8	Worse
Poudre Valley Hospital	Ft Collins	139	1	0.6	Same	141	5	2.7	Same	92	1	0.8	Same
Presbyterian St Luke's MC	Denver	26	0	0	Same	37	1	2.1	Same	57	0	0	Same
Prowers MC	Lamar	0	***	***	***	1	***	***	***	5	***	***	***
Pueblo Surgery Center ASC	Pueblo	2	***	***	***	0	***	***	***	4	***	***	***

Surgical Site Infections in Vaginal Hysterectomies in Hospitals and Ambulatory Surgery Centers (ASC), (In- and Outpatient Combined): Aug. 1, 2010 – July 31, 2013													
Health Facility and City		August 2010- July 2011				August 2011- July 2012				August 2012- July 2013			
		Procedure Count	Infection Count	SIR	National Comparison	Procedure Count	Infection Count	SIR	National Comparison	Procedure Count	Infection Count	SIR	National Comparison
Rose MC	Denver	183	0	0	Same	173	1	0.4	Same	99	0	0	Same
San Luis Valley Regional MC	Alamosa	31	0	0	Same	34	0	0	Same	18	***	***	***
Sky Ridge MC	Lone Tree	292	2	1.2	Same	320	4	2.1	Same	161	2	2.2	Same
Southwest Memorial Hospital	Cortez	4	***	***	***	1	***	***	***	12	***	***	***
St Anthony Summit MC	Frisco	2	***	***	***	5	***	***	***	8	***	***	***
St Mary's Hospital	Grand Junction	215	4	1.4	Same	130	0	0	Same	124	2	1.2	Same
Sterling Regional MC	Sterling	11	***	***	***	9	***	***	***	6	***	***	***
Surgery Center At Lutheran ASC	Wheat Ridge	0	***	***	***	2	***	***	***	8	***	***	***
Surgery Center At Printers Park ASC	Colorado Springs	2	***	***	***	4	***	***	***	0	***	***	***
Surgery Center Of Ft Collins ASC	Ft Collins	15	***	***	***	16	***	***	***	15	***	***	***
Swedish MC	Englewood	224	0	0	Same	210	0	0	Same	166	2	2.3	Same
The Memorial Hospital	Craig	0	***	***	***	4	***	***	***	0	***	***	***
University of Colorado Hospital	Aurora	130	3	1.5	Same	140	2	0.9	Same	113	0	0	Same
Vail Valley MC	Vail	31	0	0	Same	17	***	***	***	16	***	***	***
Valley View Hospital	Glenwood Springs	38	2	8.6	Worse	56	1	2.9	Same	33	1	4.5	Same
Wray Community Hospital	Wray	0	***	***	***	1	***	***	***	0	***	***	***
Yampa Valley MC	Steamboat Springs	32	0	0	Same	31	0	0	Same	34	0	0	Same

Note: MC=Medical Center; SIR=Standardized Infection Ratio, the ratio of observed to expected infections adjusted for procedure risk factors.

National comparison based on the indirect adjustment of modeled risk factors for each procedure type.

*** Indicates value not shown due to suppression of infection data, no national or historical rate available, or an expected infection count of zero.

Infections for facilities performing less than 20 procedures per year are suppressed to protect confidential health information. These facilities fulfilled reporting requirements.

Source: National Health Care Safety Network (NHSN) Database.

BREAST PROCEDURES

BACKGROUND

Breast procedures for purposes of surveillance and reporting into NHSN involve those procedures with at least one incision to the skin in either male or female patients in either inpatient or outpatient surgery locations. There are 36 breast procedures that qualify in this category and can include an open biopsy of the breast, local excision of a lesion of the breast, insertion and removal of breast implants and radical mastectomies to name a few.

RESULTS

Tables 15 and 16, show facility specific data for SSI attributed to **breast procedures** in hospitals and ASC, respectively, performed from Aug. 1, 2011 through July 31, 2013.

When numbers from all hospitals were combined, the statewide breast SSI rate was worse than the national average for this year and last year.

In this past reporting year, 61 hospitals reported 9,744 breast surgeries; 16 hospitals reported zero infections. Two hospitals (one less than last year) had breast SSI rates worse than the national average; all other hospitals had SSI rates similar to the national average. When numbers from all hospitals were combined (Table 5), the statewide breast SSI rate was worse than the national average for this year and last year.

Thirty-two ASC reported 5,714 breast surgeries. Fifteen ASC reported zero SSI. Individually and as a statewide aggregate, ASC had breast SSI rates similar to the national average.

Individually and as a statewide aggregate, ASC had breast SSI rates similar to the national average.

TABLE 15: Breast Surgeries in Hospitals, Aug. 1, 2011 – July 31, 2013

Surgical Site Infections in Breast Procedures in Hospitals (In- and Outpatient Combined): Aug. 1, 2011 – July 31, 2013									
Health Facility and City		August 2011 – July 2012				August 2012 – July 2013			
		Procedure Count	Infection Count	SIR	National Comparison	Procedure Count	Infection Count	SIR	National Comparison
Animas Surgical Hospital	Durango	122	0	0	Same	159	0	0	Same
Arkansas Valley Regional MC	La Junta	4	***	***	***	7	***	***	***
Aspen Valley Hospital	Aspen	25	0	0	Same	20	0	0	Same
Boulder Community Hospital	Boulder	170	1	0.7	Same	110	0	0	Same
Boulder Community Hospital-Foothills	Boulder	350	3	1.0	Same	176	0	0	Same
Centura Avista Adventist Hospital	Louisville	160	1	0.7	Same	153	4	2.6	Same
Centura Littleton Adventist Hospital	Littleton	282	5	3.8	Worse	307	4	2.7	Same
Centura Penrose St Francis Health	Colorado Springs	101	0	0	Same	156	0	0	Same
Centura Porter Adventist Hospital	Denver	560	3	1.4	Same	348	6	3	Worse
Centura St Anthony Hospital	Lakewood	167	6	6.6	Worse	233	7	5.3	Worse
Centura St Anthony North Hospital	Westminster	49	2	2.8	Same	44	1	1.7	Same
Centura St Francis MC	Colorado Springs	134	0	0	Same	317	1	0.3	Same
Centura St Mary Corwin MC	Pueblo	128	1	0.7	Same	148	2	1.2	Same
Centura St Thomas More Hospital	Canon City	36	0	0	Same	14	***	***	***
Colorado Plains MC	Fort Morgan	11	***	***	***	10	***	***	***
Community Hospital	Grand Junction	80	1	1.2	Same	97	1	0.9	Same
Delta County Memorial Hospital	Delta	47	2	4.0	Same	44	0	0	Same
Denver Health MC	Denver	197	2	0.6	Same	167	3	1.0	Same
East Morgan County Hospital	Brush	7	***	***	***	19	***	***	***
Estes Park MC	Estes Park	0	***	***	***	1	***	***	***
Exempla Good Samaritan MC	Lafayette	467	6	2.8	Worse	486	4	1.4	Same
Exempla Lutheran MC	Wheat Ridge	464	4	1.7	Same	426	4	1.9	Same
Exempla St Joseph Hospital	Denver	614	4	1.0	Same	920	7	1.2	Same
Family Health West Hospital	Grand Junction	8	***	***	***	54	0	0	Same
Grand River MC	Rifle	16	***	***	***	20	0	0	Same
Gunnison Valley Hospital	Gunnison	1	***	***	***	0	***	***	***
Heart of the Rockies Regional MC	Salida	14	***	***	***	18	***	***	***
Kit Carson Memorial Hospital	Burlington	0	***	***	***	1	***	***	***
Longmont United Hospital	Longmont	54	0	0	Same	93	2	2.1	Same
McKee MC	Loveland	159	0	0	Same	142	1	0.8	Same
MC of Aurora	Aurora	322	1	0.8	Same	283	3	2.6	Same

Surgical Site Infections in Breast Procedures in Hospitals (In- and Outpatient Combined): Aug. 1, 2011 – July 31, 2013

Health Facility and City		August 2011 – July 2012				August 2012 – July 2013			
		Procedure Count	Infection Count	SIR	National Comparison	Procedure Count	Infection Count	SIR	National Comparison
MC of the Rockies	Loveland	244	1	0.3	Same	266	3	0.9	Same
Memorial Hospital Central	Colorado Springs	43	0	0	Same	27	0	0	Same
Memorial Hospital North	Colorado Springs	190	4	1.7	Same	284	2	0.7	Same
Mercy Regional MC	Durango	96	1	1.0	Same	132	0	0	Same
Montrose Memorial Hospital	Montrose	53	0	0	Same	80	1	1.2	Same
Mt San Rafael Hospital	Trinidad	10	***	***	***	2	***	***	***
North Colorado MC	Greeley	154	0	0	Same	135	0	0	Same
North Suburban MC	Thornton	37	0	0	Same	49	0	0	Same
Pagosa Springs MC	Pagosa Springs	0	***	***	***	1	***	***	***
Parker Adventist Hospital	Parker	76	0	0	Same	47	1	1.2	Same
Parkview MC	Pueblo	222	1	1.2	Same	230	2	2.2	Same
Pioneers MC	Meeker	4	***	***	***	0	***	***	***
Platte Valley MC	Brighton	96	1	1.2	Same	69	1	1.7	Same
Poudre Valley Hospital	Ft Collins	137	2	2.0	Same	192	3	2.1	Same
Presbyterian St Luke's MC	Denver	434	0	0	Same	480	2	1.1	Same
Prowers MC	Lamar	1	***	***	***	0	***	***	***
Rocky Mountain Surgery Center	Englewood	5	***	***	***	3	***	***	***
Rose MC	Denver	1,519	8	1.1	Same	1,407	10	1.5	Same
San Luis Valley Regional MC	Alamosa	36	0	0	Same	30	0	0	Same
Sky Ridge MC	Lone Tree	313	6	0.8	Same	492	3	0.4	Same
Southwest Memorial Hospital	Cortez	25	1	5.2	Same	29	2	6.8	Same
Spanish Peaks Regional Health Center	Walsenburg	3	***	***	***	2	***	***	***
St Anthony Summit MC	Frisco	3	***	***	***	4	***	***	***
St Mary's Hospital	Grand Junction	177	1	1.0	Same	186	1	1.1	Same
Sterling Regional MC	Sterling	7	***	***	***	20	2	6.7	Same
Swedish MC	Englewood	49	1	1.1	Same	102	0	0	Same
The Children's Hospital	Aurora	17	***	***	***	7	***	***	***
The Memorial Hospital	Craig	5	***	***	***	0	***	***	***
University of Colorado Hospital	Aurora	298	7	2.7	Worse	410	2	0.6	Same
Vail Valley MC	Vail	141	0	0	Same	96	3	2.8	Same
Valley View Hospital	Glenwood Sprgs	140	0	0	Same	138	0	0	Same
Wray Community Hospital	Wray	1	***	***	***	2	***	***	***

Surgical Site Infections in Breast Procedures in Hospitals (In- and Outpatient Combined): Aug. 1, 2011 – July 31, 2013									
Health Facility and City		August 2011 – July 2012				August 2012 – July 2013			
		Procedure Count	Infection Count	SIR	National Comparison	Procedure Count	Infection Count	SIR	National Comparison
Yampa Valley MC	Steamboat Springs	18	***	***	***	28	0	0	Same
Yuma District Hospital	Yuma	6	***	***	***	4	***	***	***

Note: MC=Medical Center; SIR=Standardized Infection Ratio, the ratio of observed to expected infections adjusted for procedure risk factors.

National comparison based on the indirect adjustment of modeled risk factors for each procedure type.

*** Indicates value not shown due to suppression of infection data, no national or historical rate available, or an expected infection count of zero.

Infections for facilities performing less than 20 procedures per year are suppressed to protect confidential health information. These facilities fulfilled reporting requirements.

Source: National Health Care Safety Network (NHSN) Database.

Table 16: Breast Surgeries in Ambulatory Surgery Centers (ASC): Aug. 1, 2011 – July 31, 2013

Surgical Site Infections in Breast Procedures in ASCs (Outpatient): Aug. 1, 2011 – July 31, 2013									
Health Facility and City		August 2011 – July 2012				August 2012 – July 2013			
		Procedure Count	Infection Count	SIR	National Comparison	Procedure Count	Infection Count	SIR	National Comparison
ASC Durango at Mercy Medical Center	Durango	50	0	0	Same	15	***	***	***
Aberdeen Ambulatory Surgical Center	Pueblo	344	0	0	Same	354	0	0	Same
Arkansas Valley Surgery Center	Canon City	6	***	***	***	8	***	***	***
Audubon Ambulatory Surgery Center	Colo Springs	247	0	0	Same	83	0	0	Same
Audubon Ambulatory Surgery Center at St. Francis	Colo Springs	5	***	***	***	11	***	***	***
Avista Surgery Center	Boulder	432	1	0.5	Same	453	2	1.1	Same
Black Canyon Surgical Center	Montrose	3	***	***	***	0	***	***	***
Centrum Surgical Center	Greenwood Village	516	1	0.4	Same	502	0	0	Same
Clear Creek Surgery Center	Wheat Ridge	22	0	0	Same	13	***	***	***
Colorado Springs Surgery Center	Colo Springs	133	0	0	Same	110	1	1.9	Same
Crown Point Surgery Center	Parker	58	0	0	Same	125	0	0	Same
Denver Midtown Surgery Center	Denver	73	0	0	Same	33	0	0	Same
1st Choice Outpatient Surgery Ctr at Comm. Hosp.	Grand Junction	168	0	0	Same	129	0	0	Same
Grand Valley Surgical Center	Grand Junction	253	2	1.6	Same	233	1	1.0	Same
Harmony Ambulatory Surgery Center	Ft Collins	349	1	0.5	Same	370	3	1.2	Same
Kaiser Permanente Ambulatory Surgery Center	Denver	258	3	2.0	Same	212	0	0	Same
Longmont Surgery Center	Longmont	114	0	0	Same	115	0	0	Same
Midvalley Ambulatory Surgery Center LLC	Basalt	0	***	***	***	2	***	***	***
North Suburban Surgery Center	Thornton	52	0	0	Same	30	0	0	Same

Surgical Site Infections in Breast Procedures in ASCs (Outpatient): Aug. 1, 2011 – July 31, 2013									
Health Facility and City		August 2011 – July 2012				August 2012 – July 2013			
		Procedure Count	Infection Count	SIR	National Comparison	Procedure Count	Infection Count	SIR	National Comparison
Parkwest Surgery Center	Pueblo	2	***	***	***	6	***	***	***
Peak One Surgery Center	Frisco	2	***	***	***	0	***	***	***
Pueblo Surgery Center	Pueblo	16	***	***	***	14	***	***	***
Red Rocks Surgery Center	Golden	113	0	0	Same	133	0	0	Same
Renewal Surgery Center	Lone Tree	535	0	0	Same	126	0	0	Same
Rocky Mountain Surgery Center	Englewood	5	***	***	***	3	***	***	***
Rose Surgical Center	Denver	205	0	0	Same	171	0	0	Same
Sky Ridge Surgical Center	Lone Tree	2	***	***	***	1	***	***	***
Skyline Surgery Center	Loveland	26	0	0	Same	129	0	0	Same
Southwest Colorado Surgical Center	Cortez	2	***	***	***	4	***	***	***
Summit View Surgery Center	Littleton	48	1	5.2	Same	68	0	0	Same
Surgery Center At Lutheran	Wheat Ridge	129	0	0	Same	133	2	3.5	Same
Surgery Center At Printers Park	Colo Springs	502	9	3.4	Worse	588	4	1.2	Same
Surgery Center Of Ft Collins	Ft Collins	111	0	0	Same	160	2	1.7	Same
Surgical Center At Premier	Colo Springs	586	0	0	Same	603	0	0	Same

The standardized infection ratio (SIR) is the ratio of observed to expected infections adjusted for procedure risk factors. National comparison based on the indirect adjustment of modeled risk factors for each procedure type. *** Indicates value not shown due to suppression of infection data, no national or historical rate available, or an expected infection count of zero. Infections for facilities performing less than 20 procedures per year are suppressed to protect confidential health information. These facilities fulfilled reporting requirements.

Source: National Health Care Safety Network (NHSN) Database.

CENTRAL LINE-ASSOCIATED BLOODSTREAM INFECTIONS OVERVIEW

BACKGROUND

Central line associated bloodstream infections (CLABSI) are associated with specific intravascular catheters or central lines that must be in place at the time of, or within 48 hours before the onset of the infection. A central line is an intravascular catheter (tube in a vein or artery) that terminates at or close to the heart or in one of the great vessels specified by NHSN. Two examples of a great vessel are the aorta and superior vena cava. A central line can be used to infuse fluids, withdraw blood or monitor fluid volume in patients. An umbilical catheter (i.e., a tube placed in the umbilical cord) is a central vascular catheter inserted through the umbilical artery or vein in a neonate (infant \leq 30 days old). Central lines can be either permanent or temporary. Permanent lines are those that are tunneled under the skin before entering a great vessel. These can include certain dialysis lines and implanted catheters such as a port. Temporary lines are those that are not tunneled.

All patients with central lines are at risk for CLABSI. However, certain groups are at higher risk for infection: elderly, neonates, dialysis patients, patients with weak immune systems (e.g., cancer patients, transplant patients), diabetics and patients with burn injuries.

Colorado requires that all adult critical care units, neonatal critical care units Level II/III and III, long term acute care hospitals (LTAC), inpatient rehabilitation units and rehabilitation hospitals report CLABSI data into NHSN.

Every CLABSI data table below lists all Colorado hospitals and hospital unit(s) reporting central line use, their cities, number of central line days per year, infection counts and rates, and comparisons to national infection rates. The number of central line days is the total number of days a central line was used in the unit during the reporting period. The CLABSI rate is the number of infections per 1,000 central line days. The three categories summarizing how a Colorado facility compares to the national infection rate for that unit are:

1. Statistically lower (**better**) infection rate than the national rate;
2. Statistically similar (**same**) infection rate as the national rate; or
3. Statistically higher (**worse**) infection rate than the national rate.

ADULT CRITICAL CARE UNITS

Adult critical care units (CCU) report central line data by facility type, central line type and unit type. This differentiation enables fairer comparisons between health facilities by accounting for differences in care and patients' risk for infection that impact infection rates.

Hospitals identify their CCU by counting the type of patients cared for in the unit. For instance, if a medical CCU serves non-surgical patients and the majority of their critical care patients are non-surgical, that facility would have a medical CCU according to the NHSN definitions.

RESULTS

Table 17 shows facility specific data for **CLABSI attributed to the adult critical care unit** types from Aug. 1, 2010 through July 31, 2013.

The statewide aggregate CLABSI rate for adult critical care units was better than the national average this past year.

Sixty-one adult critical care units in 47 Colorado hospitals reported 109,142 central line days in the last reporting year. Of the 61 hospital units, 28 reported zero CLABSI. Two hospitals had CLABSI rates better than the national average. Only one hospital had a unit with a CLABSI rate worse than the national average, compared to two hospitals last year. When CLABSI data were combined across all adult CCU, the statewide aggregate CLABSI rate was better than the national average this past year.

TABLE 17: Adult Critical Care Unit Central Line-Associated Bloodstream Infection (CLABSI) Rates, Aug. 1, 2010 – July 31, 2013

Central Line-Associated Blood Stream Infections (CLABSI): Aug. 1, 2011 – July 31, 2013														
Health Facility, City, Unit Type			August 2010 – July 2011				August 2011 – July 2012				August 2012 – July 2013			
			Central LineDays	CLABSI Count	CLABSI Rate	National Comparison	Central LineDays	CLABSI Count	CLABSI Rate	National Comparison	Central Line Days	CLABSI Count	CLABSI Rate	National Comparison
Arkansas Valley Regional MC	La Junta	MICU/SICU	175	0	0	Same	128	0	0	Same	61	0	0	Same
Aspen Valley Hospital	Aspen	MICU/SICU	40	***	***	***	39	***	***	***	54	0	0	Same
Boulder Community Hospital	Boulder	MICU/SICU	1,814	1	0.6	Same	1,756	0	0	Same	1,909	0	0	Same
Boulder Community Hospital-Foothills	Boulder	MICU	234	0	0	Same	206	0	0	Same	0	***	***	***
Centura Avista Adventist Hospital	Louisville	MICU/SICU	408	0	0	Same	481	1	2.1	Same	613	0	0	Same
Centura Littleton Adventist Hospital	Littleton	MICU/SICU	2,677	3	1.1	Same	2,699	2	0.7	Same	2,787	2	0.7	Same
Centura Penrose St Francis Health	Colorado Springs	MICU/SICU	2,986	3	1.0	Same	3,428	5	1.5	Same	3,763	5	1.3	Same
Centura Porter Adventist Hospital	Denver	MICU/SICU	3,803	5	1.3	Same	4,167	5	1.2	Same	3,661	2	0.5	Same
Centura St Anthony Hospital	Lakewood	MICU	2,200	1	0.5	Same	2,281	4	1.8	Same	2,073	0	0	Same
		MICU/SICU	1,081	0	0	Same	1,442	0	0	Same	1,737	3	1.7	Same
		NEURO ICU	Reporting began August 2011				2,205	2	0.9	Same	1,753	2	1.1	Same
		CSICU	2,031	4	2.0	Same	2,136	4	1.9	Same	2,074	0	0	Same
		TraumaICU	Reporting began August 2011				2,205	2	0.9	Same	1,744	1	0.6	Same
Centura St Anthony North Hospital	Westminster	MICU	2,544	7	2.8	Same	2,445	2	0.8	Same	499	1	2.0	Same
		MICU/SICU	0	***	***	***	1,533	0	0	Same	2,335	1	0.4	Same
Centura St Francis MC	Colorado Springs	MICU/SICU	425	1	2.4	Same	337	0	0	Same	415	1	2.4	Same
Centura St Mary Corwin MC	Pueblo	MICU/SICU	2,263	3	1.3	Same	2,154	3	1.4	Same	1,658	3	1.8	Same
Centura St Thomas More Hospital	Canon City	MICU/SICU	205	0	0	Same	129	0	0	Same	106	0	0	Same
Colorado Plains MC	Fort Morgan	MICU/SICU	58	0	0	Same	60	0	0	Same	36	***	***	***
Community Hospital	Grand Junction	MICU	0	***	***	***	358	0	0	Same	268	0	0	Same
		MICU/SICU	449	0	0	Same	0	***	***	***	69	0	0	Same
Delta County Memorial Hospital	Delta	MICU/SICU	438	0	0	Same	436	0	0	Same	372	0	0	Same
Denver Health MC	Denver	MICU	2,762	1	0.4	Same	3,415	0	0	Better	3,196	4	1.3	Same
		TraumaICU	Reporting began August 2011				2,447	1	0.4	Same	2,794	0	0	Better
Exempla Good Samaritan MC	Lafayette	MICU/SICU	2,406	3	1.2	Same	2,228	0	0	Same	2,010	1	0.5	Same

Central Line-Associated Blood Stream Infections (CLABSI): Aug. 1, 2011 – July 31, 2013														
Health Facility, City, Unit Type			August 2010 – July 2011				August 2011 – July 2012				August 2012 – July 2013			
			Central LineDays	CLABSI Count	CLABSI Rate	National Comparison	Central LineDays	CLABSI Count	CLABSI Rate	National Comparison	Central Line Days	CLABSI Count	CLABSI Rate	National Comparison
Exempla Lutheran MC	Wheat Ridge	MICU/SICU	3,530	4	1.1	Same	4,864	6	1.2	Same	4,821	1	0.2	Same
Exempla St Joseph Hospital	Denver	MICU/SICU	4,757	1	0.2	Better	4,399	2	0.5	Same	3,698	0	0	Better
Heart of the Rockies Regional MC	Salida	MICU/SICU	21	***	***	***	11	***	***	***	23	***	***	***
Longmont United Hospital	Longmont	MICU/SICU	3,078	0	0	Same	3,130	1	0.3	Same	2,429	0	0	Same
McKee MC	Loveland	MICU/SICU	705	0	0	Same	710	0	0	Same	817	0	0	Same
MC of Aurora	Aurora	MICU/SICU	5,034	8	1.6	Same	4,715	2	0.4	Same	4,793	5	1.0	Same
MC of the Rockies-South Wing	Loveland	MICU/SICU	3,431	0	0	Same	3,667	2	1.2	Same	4,021	0	0	Same
Memorial Hospital Central	Colorado Springs	MICU/SICU	5,600	4	0.7	Same	5,179	2	0.4	Same	4,963	3	0.6	Same
Memorial Hospital North	Colorado Springs	MICU/SICU	358	0	0	Same	285	0	0	Same	268	0	0	Same
Mercy Regional MC	Durango	MICU/SICU	1,227	0	0	Same	1,135	2	1.8	Same	1,019	0	0	Same
Montrose Memorial Hospital	Montrose	MICU/SICU	336	0	0	Same	252	0	0	Same	345	0	0	Same
North Colorado MC	Greeley	MICU/SICU	2,458	0	0	Same	1,889	3	1.6	Same	2,338	0	0	Same
North Suburban MC	Thornton	MICU/SICU	1,732	1	0.6	Same	2,900	2	0.7	Same	2,382	4	1.7	Same
Parker Adventist Hospital	Parker	MICU/SICU	1,321	2	1.5	Same	1,688	1	0.6	Same	1,475	0	0	Same
Parkview MC	Pueblo	MICU/SICU	1,361	0	0	Same	1,470	11	7.5	Worse	1,579	2	1.3	Same
		NEURO ICU					1,157	3	2.6	Same	1,147	1	0.9	Same
Platte Valley MC	Brighton	MICU	1,169	0	0	Same	867	0	0	Same	444	0	0	Same
Poudre Valley Hospital	Fort Collins	MICU/SICU	1,792	0	0	Same	1,466	1	0.7	Same	1,365	0	0	Same
Presbyterian St Luke's MC	Denver	MICU/SICU	2,350	0	0	Same	2,475	0	0	Same	2,215	2	0.9	Same
Rose MC	Denver	MICU/SICU	2,366	3	1.3	Same	2,068	0	0	Same	2,004	0	0	Same
San Luis Valley Regional MC	Alamosa	MICU/SICU	235	0	0	Same	249	0	0	Same	138	0	0	Same
Sky Ridge MC	Lone Tree	MICU/SICU	2,439	5	2.1	Same	2,601	2	0.8	Same	2,505	1	0.4	Same
Southwest Memorial Hospital	Cortez	MICU/SICU	177	0	0	Same	180	0	0	Same	119	0	0	Same
St Anthony Summit MC	Frisco	MICU/SICU	99	0	0	Same	79	0	0	Same	41	***	***	***
St Mary's Hospital	Grand Junction	CSICU	4,313	1	0.2	Same	5,025	4	0.8	Same	5,869	1	0.2	Same
Sterling Regional MC	Sterling	MICU/SICU	159	0	0	Same	191	0	0	Same	197	0	0	Same

Central Line-Associated Blood Stream Infections (CLABSI): Aug. 1, 2011 – July 31, 2013														
Health Facility, City, Unit Type			August 2010 – July 2011				August 2011 – July 2012				August 2012 – July 2013			
			Central LineDays	CLABSI Count	CLABSI Rate	National Comparison	Central LineDays	CLABSI Count	CLABSI Rate	National Comparison	Central Line Days	CLABSI Count	CLABSI Rate	National Comparison
Swedish MC	Englewood	MICU/SICU	7,925	9	1.1	Same	4,565	10	4.4	Same	4,657	9	1.9	Same
		NEURO ICU	Reporting began August 2011				1,245	0	0	Same	2,165	3	1.4	Same
		TraumaICU	Reporting began August 2011				430	0	0	Same	720	2	2.8	Same
University of Colorado Hospital	Aurora	Burn ICU	Reporting began August 2011				1,538	5	3.3	Same	1,263	5	4.0	Same
		CCU	1,142	1	0.9	Same	1,152	1	0.9	Same	1,352	4	3.0	Same
		MICU	3,712	8	2.2	Same	3,703	7	1.9	Same	3,771	10	2.7	Worse
		NEURO ICU	Reporting began August 2011				2,755	8	2.9	Worse	3,410	3	0.9	Same
SICU	3,299	5	1.5	Same	3,720	6	1.6	Same	4,445	8	1.8	Same		
	Vail Valley MC	Vail	MICU/SICU	235	0	0	Same	213	0	0	Same	80	0	0
Valley View Hospital	Glenwood Springs	MICU/SICU	204	0	0	Same	221	0	0	Same	255	0	0	Same
Yampa Valley MC	Steamboat Springs	MICU/SICU	36	***	***	***	14	***	***	***	22	***	***	***

Facility CLABSI rates are per 1,000 central line days.

*** Indicates value not shown due to suppression of infection data, no national or historical rate available, or an expected infection count of zero.

Infections for facilities with fewer than 50 central line days per year are suppressed to protect confidential health information. These facilities fulfilled reporting requirements.

Note: MICU=Medical intensive care unit; SICU=Surgical intensive care unit; ICU= intensive care unit; CCU=Critical care unit; CSICU=Cardiothoracic surgical intensive care unit;

Source: National Health Care Safety Network (NHSN) Database.

LONG-TERM ACUTE CARE HOSPITALS

A long-term acute care hospital (LTAC) is a specialty care hospital that cares for patients with complex medical conditions requiring intense, specialized treatment for a long period of time. The average length of stay for a patient is 25 days. These patients often transfer from critical care units in traditional hospitals. Patients in these facilities have a higher severity of illness often with multi-system complications posing a challenge for infection control.

LTAC report infection data for patients with either permanent or temporary central lines. As previously noted, permanent lines are those that are tunneled and can include certain dialysis lines and implanted catheters such as a port. Temporary lines are those that are not tunneled. Permanent lines are commonly used in LTAC patients and historically have had lower rates of infection than temporary lines.

This past year, nine LTAC reported 38,465 central line days; three hospitals reported zero CLABSI and two of those performed better than the national average.

RESULTS

Table 18 shows facility specific data for **CLABSI in LTAC**. The table contains data from Aug. 1, 2010 through July 31, 2013.

In Colorado this past year, nine LTAC reported 38,465 central line days; three hospitals reported zero CLABSI and two of those performed better than the national average.

TABLE 18: Long-Term Acute Care Hospital CLABSI Rates, Aug. 1, 2010 – July 31, 2013

Central Line Associated Blood Stream Infections (CLABSI) in Long-Term Acute Care Hospitals: Aug. 1, 2011 – July 31, 2013													
Health Facility and City		August 2010 – July 2011				August 2011 – July 2012				August 2012 – July 2013			
		CL Days	CLABSI Count	CLABSI Rate	National Comparison	CL Days	CLABSI Count	CLABSI Rate	National Comparison	CL Days	CLABSI Count	CLABSI Rate	National Comparison
Colorado Acute Long Term Hospital	Denver	6,710	6	0.9	Same	6,656	5	0.8	Same	5,902	7	1.2	Same
Craig Hospital	Englewood	4,835	1	0.2	Better	3,748	3	0.8	Same	3,283	3	0.9	Same
Kindred Hospital	Denver	4,985	9	1.8	Same	6,015	10	1.7	Same	5,540	10	1.8	Same
Northern Colorado Long Term Acute Hospital	Johnstown	3,709	6	1.6	Same	4,018	7	1.7	Same	595	0	0	Same
Select Long Term Care Hospital	Colorado Springs	4,248	4	0.9	Same	4,991	1	0.2	Better	4,070	0	0	Better
Select Specialty Hospital South Campus	Denver	4,678	2	0.4	Same	3,550	0	0	Better	2,641	1	0.4	Same
Select Specialty Hospital	Denver	5,818	4	0.7	Same	4,744	0	0	Better	3,278	0	0	Better
Triumph Acute Long Term Care Hospital of Aurora	Aurora	4,151	9	2.2	Same	4,398	9	2.0	Same	4,067	1	0.3	Same
Vibra Long Term Acute Care Hospital	Thornton	8,068	3	0.4	Better	6,085	3	0.5	Same	6,249	10	1.6	Same

Note: CL=Central Line.

Facility CLABSI rates are per 1,000 central line days.

*** Indicates value not shown due to suppression of infection data, no national or historical rate available, or an expected infection count of zero.

Infections for facilities with fewer than 50 central line days per year are suppressed to protect confidential health information. These facilities fulfilled reporting requirements.

Source: National Health Care Safety Network (NHSN) Database.

REHABILITATION HOSPITALS AND INPATIENT HOSPITAL UNITS

Rehabilitation hospitals and hospital units care for patients who have lost function due to acute or chronic pain, musculoskeletal problems, stroke, brain or spinal cord dysfunction, or catastrophic events resulting in complete or partial paralysis. The goal for these areas is to evaluate, treat and restore optimal functioning of the patients physically and mentally.

Rehabilitation hospitals and hospital units report infection data for patients with either permanent or temporary central lines. Permanent lines are those that are tunneled under the skin before entering a great vessel. These can include certain dialysis lines and implanted catheters such as a port. Temporary lines are those that are not tunneled.

RESULTS

Table 19 shows facility specific data for CLABSI in rehab hospitals and wards. The table contains data from Jan. 1, 2012 through July 31, 2013.

Five rehabilitation hospitals and 11 rehab wards reported 8,157 central line days this past year. All but one facility reported zero infections and all facilities' rates were similar to the national average.

TABLE 19: Inpatient Rehabilitation Hospital and Ward CLABSI Rates, Jan. 1, 2012 – July 31, 2013

Central Line Associated Blood Stream Infections (CLABSI) in Inpatient Rehabilitation Hospitals and Wards: Jan. 1, 2012 – July 31, 2013									
Health Facility and City		January 2012 – July 2012				August 2012 – July 2013			
		Central Line Days	CLABSI Count	CLABSI Rate	National Comparison	Central Line Days	CLABSI Count	CLABSI Rate	National Comparison
Boulder Community Hospital	Boulder	283	0	0	Same	797	0	0	Same
Centura Penrose St Francis Health	Colo Springs	284	0	0	Same	697	0	0	Same
Centura Porter Adventist Hospital	Denver	490	1	2.0	Same	605	0	0	Same
Centura St Anthony Hospital	Lakewood	252	0	0	Same	633	2	3.2	Same
Centura St Mary Corwin MC	Pueblo	142	0	0	Same	202	0	0	Same
Denver Health MC	Denver	240	0	0	Same	294	0	0	Same
HealthSouth Rehabilitation Hospital of Colorado Springs	Colo Springs	255	0	0	Same	662	0	0	Same
HealthSouth Rehabilitation Hospital of Denver	Denver	Not yet operating				59	0	0	Same
Memorial Hospital Central	Colo Springs	478	0	0	Same	726	0	0	Same
Northern Colorado Rehabilitation Hospital	Johnstown	951	1	1.1	Same	911	0	0	Same
Poudre Valley Hospital	Fort Collins	125	0	0	Same	29	***	***	***
Spalding Rehabilitation Hospital	Aurora	709	0	0	Same	1,370	0	0	Same
Spalding at PSL	Denver	851	0	0	Same	871	0	0	Same
St Mary's Hospital	Grand Junction	371	0	0	Same	Data Not Reported			
Swedish MC	Englewood	284	0	0	Same	502	0	0	Same
University of Colorado Hospital	Aurora	988	0	0	Same	1,169	0	0	Same

Facility CLABSI rates are per 1,000 central line days.

*** Indicates value not shown due to suppression of infection data, no national or historical rate available, or an expected infection count of zero.

Infections for facilities with fewer than 50 central line days per year are suppressed to protect confidential health information. These facilities fulfilled reporting requirements. Source: National Health Care Safety Network (NHSN) Database.

NEONATAL CRITICAL CARE UNITS

Neonatal critical care units (NCCU) are classified according to levels of care. Since Level I and II units care for healthy newborns, they are not required to report HAI. Colorado requires only level III and level II/III units to report CLABSI data. Level III NCCU provide personnel and equipment to ensure continuous life support and comprehensive care for extremely high-risk newborns with complex critical conditions. The designation between Level III and Level II/III is defined by the NHSN reporting guidelines. If a hospital unit does not separate infants receiving Level II care from those receiving Level III care, that NCCU is reported as a Level II/III.

NCCU infants will often have a central line inserted for several reasons: 1) their stay in the critical care unit can be several days to months; 2) they require intravenous nutrition and fluid replacement until their gastrointestinal system has matured or they can tolerate feedings by mouth; 3) their peripheral veins (those in the arms and legs) and scalp veins are small and unable to be used for sugar solutions and medications for long periods of time; and 4) changing peripheral lines frequently can cause additional pain and stress for the infant and does not promote health. An umbilical catheter (i.e., a tube placed in the umbilical cord) is often inserted at birth as a means to provide nutrition while monitoring fluid balance. These catheters are a type of central line inserted through the umbilical artery or vein in a neonate (infant \leq 30 days old).

Of 17 hospitals with NCCU, 11 reported zero CLABSI and all had rates similar to national rates.

RESULTS

Table 20 shows the results of data collected in each NCCU from Aug. 1, 2010 through July 31, 2013.

Seventeen hospitals, including five Level III and 12 Level II/III NCCU, reported 17,842 central line days this past year. Of the 17 hospitals, 11 reported zero CLABSI and all had rates similar to national rates.

TABLE 20: Neonatal Critical Care Unit CLABSI Rates, Aug. 1, 2010 – July 31, 2013

Central Line Associated Blood Stream Infections (CLABSI) in Neonatal Critical Care Units: Aug. 1, 2010 – July 31, 2013														
Health Facility, City, NCCU Type/Level			August 2010 – July 2011				August 2011 – July 2012				August 2012 – July 2013			
			CL Days	CLABSI	CLABSI Rate	National Comparison	CL Days	CLABSI	CLABSI Rate	National Comparison	CL Days	CLABSI	CLABSI Rate	National Comparison
Centura Avista Adventist Hospital	Louisville	II/III	179	0	0	Same	128	0	0	Same	165	0	0	Same
Centura Littleton Adventist Hospital	Littleton	III	401	1	2.5	Same	265	0	0	Same	156	0	0	Same
Centura St Francis MC	Colorado Springs	II/III	1,164	0	0	Same	1,487	1	0.7	Same	1,496	1	0.7	Same
Denver Health MC	Denver	II/III	1,062	1	0.9	Same	734	1	1.4	Same	760	0	0	Same
Exempla Lutheran MC	Wheat Ridge	II/III	340	0	0	Same	380	0	0	Same	227	0	0	Same
Exempla St Joseph Hospital	Denver	II/III	1,270	1	0.8	Same	926	4	4.3	Same	585	0	0	Same
MC of Aurora	Aurora	II/III	58	0	0	Same	100	1	10	Same	75	0	0	Same
Memorial Hospital Central	Colorado Springs	III	2,610	5	1.9	Same	2,294	5	2.2	Same	1,405	2	1.4	Same
Parker Adventist Hospital	Parker	II/III	244	0	0	Same	222	0	0	Same	133	0	0	Same
Poudre Valley Hospital	Fort Collins	II/III	1,046	1	1.0	Same	1,032	1	1.0	Same	963	0	0	Same
Presbyterian St Luke's MC	Denver	III	4,201	6	1.4	Same	3,870	0	0	Better	4,434	4	0.9	Same
Rose MC	Denver	II/III	446	0	0	Same	375	0	0	Same	351	0	0	Same
Sky Ridge MC	Lone Tree	II/III	128	0	0	Same	113	0	0	Same	115	0	0	Same
St Mary's Hospital	Grand Junction	III	925	0	0	Same	745	0	0	Same	828	2	2.4	Same
Swedish MC	Englewood	II/III	399	0	0	Same	235	0	0	Same	296	0	0	Same
The Children's Hospital	Aurora	III	4,260	10	2.3	Same	4,153	6	1.4	Same	4,430	5	1.1	Same
University of Colorado Hospital	Aurora	II/III	2,578	1	0.4	Same	1,584	1	0.6	Same	672	3	4.5	Same

Facility CLABSI rates are per 1,000 central line days.

*** Indicates value not shown due to suppression of infection data, no national or historical rate available, or an expected infection count of zero.

Infections for facilities with fewer than 50 central line days per year are suppressed to protect confidential health information. These facilities fulfilled reporting requirements.

Source: National Health Care Safety Network (NHSN) Database.

DIALYSIS RELATED-INFECTION OVERVIEW

BACKGROUND

According to the National Institute of Diabetes and Digestive and Kidney Diseases 2010 figures, more than 20 million people aged 20 and older have chronic kidney disease in the United States. In 2009, more than 871,000 patients in the United States received chronic dialysis treatment.⁸

Surveillance for dialysis related infections in Colorado occurs within outpatient dialysis centers only and excludes peritoneal and home dialysis. The outpatient facilities monitored may be dedicated, stand-alone facilities, hospital-based or affiliated units that primarily serve this patient population. The reporting of dialysis related infections began in March 2010, and currently there are 71 dialysis centers reporting to NHSN; 70 submitted data to NHSN in the last reporting period.

Statewide, Colorado's ARB rates have been better than the national rate for the last three reporting years.

Dialysis centers in Colorado monitor patients for any of three specific events that must be reported: 1) an outpatient start of an intravenous antibiotic, 2) a positive blood culture, or 3) pus, redness or increased swelling at the vascular access site. This report depicts counts and rates of vascular access infections for each dialysis center and includes two types of dialysis related infections: local access infections (LAI) and access-related blood stream infections (ARB). An LAI is defined as the presence of pus, redness or swelling of the vascular access site without the presence of an ARB. An ARB, which poses more serious health implications and requires higher levels of care, is determined by the presence of a microorganism identified in a blood culture and the source of infection is reported as the vascular access site. Although an LAI is not as severe as an ARB, antibiotics typically are given in either case.

Each table below lists the dialysis center's name, city, number of dialysis patients, numbers and rates of ARB and LAI, and for ARB only, comparisons to the national average. Currently, no national averages have been established for LAI. The infection rate used is the number of infections per 100 patient months. The three categories that indicate how a Colorado dialysis center's infection rates compare to national infection rates are:

1. Statistically fewer (**better**) infections than expected based on national infection rates;
2. Statistically similar (**same**) infections as expected based on the national infection rates; or
3. Statistically more (**worse**) infections than expected based on national infection rates.

RESULTS

Table 21 and 22 shows the number and rates of ARB and LAI for each DTC in Colorado. The reporting period is Aug. 1, 2011 through July 31, 2013.

Seventy dialysis treatment centers submitted DRI data into NHSN this past year. Six reported zero ARB infections; four centers had ARB rates better than the national rate and one had rates that were worse. Table 7 shows statewide, Colorado's ARB rates have been better than the national rate for the last three reporting years. The facility-specific LAI counts and rates presented in Table 22 below show 6 facilities with zero LAI; however, since no national rate for LAI has been established, comparisons are not yet available.

TABLE 21: Dialysis Access-Related Bloodstream Infections, Aug. 1, 2010 – July 31, 2013

Dialysis Access-Related Bloodstream infections: Aug. 1, 2010 – July 31, 2013													
Dialysis Center and City		August 2010- July 2011				August 2011-July 2012				August 2012- July 2013			
		# of Patients	Infection Count	Rate	National Comparison	# of Patients	Infection Count	Rate	National Comparison	# of Patients	Infection Count	Rate	National Comparison
AR Kidney Center Of Arvada	Arvada	948	6	0.6	Same	930	2	0.2	Same	1,059	4	0.4	Same
AR Kidney Center Of Lafayette	Lafayette	474	1	0.2	Same	547	2	0.4	Same	543	1	0.2	Same
AR Kidney Center Of Lakewood	Lakewood	807	2	0.2	Same	781	3	0.4	Same	639	1	0.2	Same
AR Kidney Center Of Longmont	Longmont	944	7	0.7	Better	1,001	12	1.2	Same	897	7	0.8	Same
AR Kidney Center Westminster	Westminster	1,319	6	0.5	Better	1,358	6	0.4	Same	1,340	5	0.4	Same
AR Kidney Center On Main	Longmont	Not yet operating				74	0	0	Same	341	2	0.6	Same
AR Kidney Center Of Bear Creek	Lakewood	Not yet operating				244	2	0.8	Same	310	1	0.3	Same
AR Thornton Kidney Center	Thornton	Not yet operating				202	1	0.5	Same	435	2	0.5	Same
Children's Hospital Colorado	Aurora	Not yet operating				99	8	8.1	Worse	194	4	2.1	Same
Davita Alamosa Dialysis	Alamosa	545	3	0.6	Same	541	0	0	Same	675	4	0.6	Same
Davita Arvada Dialysis	Arvada	490	0	0	Same	366	2	0.5	Same	376	3	0.8	Same
Davita Aurora Dialysis	Aurora	1,707	0	0	Better	1,478	21	1.4	Worse	1,551	18	1.2	Worse
Davita Belcaro Dialysis	Denver	745	9	1.2	Same	698	5	0.7	Same	646	3	0.5	Same
Davita Black Canyon Dialysis	Montrose	74	0	0	Same	191	2	1.0	Same	260	1	0.4	Same
Davita Boulder Dialysis	Boulder	357	2	0.6	Same	280	0	0	Same	280	0	0	Same
Davita Brighton Dialysis	Brighton	570	9	1.6	Worse	562	0	0	Better	521	3	0.6	Same
Davita Commerce City Dialysis	CommerceCty	657	1	0.2	Same	627	2	0.3	Same	627	5	0.8	Same
Davita Cortez Dialysis	Cortez	748	0	0	Better	801	1	0.1	Same	695	2	0.3	Same
Davita Denver Dialysis	Denver	880	5	0.6	Better	825	3	0.4	Same	817	2	0.2	Same
Davita Durango Dialysis	Durango	384	0	0	Same	342	1	0.3	Same	368	1	0.3	Same
Davita East Aurora Dialysis	Aurora	1,335	5	0.4	Same	1,280	12	0.9	Same	1,149	4	0.3	Same
Davita Englewood Dialysis	Englewood	605	2	0.3	Better	590	4	0.7	Same	539	5	0.9	Same
Davita Fountain Dialysis	Fountain	422	3	0.7	Same	407	1	0.2	Same	431	0	0	Same
Davita Grand Junction	Grnd Junction	855	10	1.2	Same	715	2	0.3	Same	745	5	0.7	Same
Davita Lakewood Crossing	Lakewood	1,219	7	0.6	Same	1,225	11	0.9	Same	1,040	6	0.6	Same
Davita Lakewood Dialysis	Lakewood	1,057	20	1.9	Worse	1,051	5	0.5	Same	1,024	10	1.0	Same
Davita Littleton Dialysis	Littleton	897	1	0.1	Better	883	0	0	Better	718	1	0.1	Better
Davita Lonetree-Skyridge	Lone tree	552	4	0.7	Same	471	0	0	Same	354	1	0.3	Same
Davita Longmont Dialysis	Longmont	420	4	1.0	Same	314	1	0.3	Same	256	2	0.8	Same
Davita Lowry Dialysis	Lowry	1,126	1	0.1	Better	1,066	13	1.2	Worse	1,023	6	0.6	Same
Davita Mesa County Dialysis	Grnd Junction	245	4	1.6	Same	225	3	1.3	Same	303	2	0.7	Same
Davita North Colo Sprgs Dialysis	Colo Sprgs	210	2	1.0	Same	140	2	1.4	Same	142	0	0	Same
Davita North Metro Dialysis	Westminster	377	1	0.3	Same	400	2	0.5	Same	383	2	0.5	Same
Davita Northeastern Colo Dialysis	Sterling	406	16	3.9	Same	368	2	0.5	Same	412	3	0.7	Same
DaVita Parker Dialysis	Parker	288	0	0	Same	325	2	0.6	Same	377	3	0.8	Same

Dialysis Access-Related Bloodstream infections: Aug. 1, 2010 – July 31, 2013													
Dialysis Center and City		August 2010- July 2011				August 2011-July 2012				August 2012- July 2013			
		# of Patients	Infection Count	Rate	National Comparison	# of Patients	Infection Count	Rate	National Comparison	# of Patients	Infection Count	Rate	National Comparison
Davita Pikes Peak Dialysis	Colo Sprgs	981	8	0.8	Same	1,022	4	0.4	Same	1,004	11	1.1	Same
Davita Printers Place Dialysis	Colo Sprgs	267	0	0	Same	196	0	0	Same	195	1	0.5	Same
Davita Red Hawk Dialysis	Castle Rock	Not yet operating				8	***	***	***	77	1	1.3	Same
Davita Sable Dialysis	Aurora	Not yet operating				Not yet operating				418	4	1.0	Same
Davita South Denver Dialysis	Denver	778	2	0.3	Same	746	2	0.3	Same	618	2	0.3	Same
Davita Southwest Denver Dialysis	Denver	***	***	***	***	84	1	1.2	Same	270	1	0.4	Same
Davita Thornton Dialysis	Thornton	958	5	0.5	Same	982	6	0.6	Same	824	2	0.2	Same
DaVita Westminster Dialysis	Westminster	786	4	0.5	Same	700	1	0.1	Same	531	1	0.2	Same
Denver Women's Correctional Cntr	Denver	240	0	0	Same	285	0	0	Same	120	Events Not Reported		
Dialysis Clinic Inc. Grand Junction	Grnd Junction	148	1	0.7	Same	175	1	0.6	Same	252	0	0	Same
Dialysis Clinic Inc. Montrose	Montrose	434	2	0.5	Same	381	1	0.3	Same	399	1	0.3	Same
FMC Canon City	Canon City	396	3	0.8	Same	409	7	1.7	Same	430	3	0.7	Same
FMC Denver Central Dialysis	Denver	1,280	10	0.8	Same	1,246	12	1.0	Same	1,156	7	0.6	Same
FMC East Denver	Aurora	1,148	3	0.3	Same	1,241	2	0.2	Better	1,200	3	0.3	Same
FMC Fort Collins Dialysis	Fort Collins	946	0	0	Better	973	0	0	Better	893	6	0.7	Same
FMC Greeley	Greeley	1,319	1	0.1	Better	1,365	0	0	Better	1,405	2	0.1	Better
FMC La Junta	La Junta	388	6	1.5	Same	427	1.0	0.2	Better	453	3	0.7	Better
FMC Lamar	Lamar	308	7	2.3	Same	271	4	1.5	Same	280	2	0.7	Same
FMC Loveland Dialysis	Loveland	708	12	1.7	Same	719	8	1.1	Same	653	4	0.6	Same
FMC Pavilion	Denver	Not yet operating				Not yet operating				184	2	1.1	Same
FMC Pueblo	Pueblo	804	1	0.1	Better	734	0	0	Better	709	2	0.3	Better
FMC Pueblo South	Pueblo	874	6	0.7	Same	923	5	0.5	Same	1,012	15	1.5	Same
FMC Pueblo West Dialysis	Pueblo	169	0	0	Same	290	1	0.3	Same	277	1	0.4	Same
FMC Rocky Mountain Dialysis	Denver	1,126	11	1.0	Same	1,085	11	1.0	Same	1,010	10	1.0	Same
FMC Stapleton Dialysis	Denver	552	5	0.9	Better	527	3	0.6	Same	522	3	0.6	Same
FMC Walsenburg	Walsenburg	171	0	0	Same	147	3	2.0	Same	158	3	1.9	Same
FMC West Hampden	Englewood	Not yet operating				Not yet operating				26	***	***	***
Liberty Dialysis - Castle Rock	Castle Rock	97	0	0	Same	132	0	0	Same	135	1	0.7	Same
Liberty Dialysis Colo Sprgs Central	Colo Sprgs	788	3	0.4	Same	1,132	6	0.5	Same	1,120	7	0.6	Same
Liberty Dialysis Colo Sprgs North	Colo Sprgs	433	3	0.7	Same	460	0	0	Better	457	2	0.4	Same
Liberty Dialysis Colo Sprgs South	Colo Sprgs	540	9	1.7	Same	570	3	0.5	Same	677	1	0.1	Same
Liberty Dialysis Pueblo	Pueblo	533	2	0.4	Same	536	3	0.6	Same	500	3	0.6	Same
Reliant Renal Care - Colo Sprgs	Colo Sprgs	190	1	0.5	Same	170	1	0.6	Same	60	0	0	Same
Reliant Renal Care - Trinidad	Trinidad	186	0	0	Same	156	0	0	Same	64	0	0	Same
UC Hospital Chronic Dialysis Unit	Denver	417	1	0.2	Same	389	4	1.0	Same	299	2	0.7	Same

Note: AR=American Renal, FMC=Fresenius Medical Care. Dialysis infection rates are per 100 patient months. National comparison based on data collected and reported by NHSN from Jan-Dec 2006.

TABLE 22: Dialysis Local Access Infections, Aug. 1, 2011 – July 31, 2013

Dialysis-Related Infections: Local Access Infections: August 1, 2011 – July 31, 2013							
Dialysis Center and City		August 2011- July 2012			August 2012- July 2013		
		# of Patients	Infection Count	Rate	# of Patients	Infection Count	Rate
AR Kidney Center Of Arvada	Arvada	930	23	2.5	1,059	16	1.5
AR Kidney Center Of Lafayette	Lafayette	547	0	0	543	1	0.2
AR Kidney Center Of Lakewood	Lakewood	7811	11	1.4	639	11	1.7
AR Kidney Center Of Longmont	Longmont	1,001	9	0.9	897	3	0.3
AR Kidney Center Westminster	Westminster	1,358	17	1.3	1,340	17	1.3
AR Kidney Center On Main	Longmont	74	2	2.7	341	2	0.6
AR Kidney Center Of Bear Creek	Lakewood	244	8	3.3	310	6	1.9
AR Thornton Kidney Center	Thornton	202	3	1.5	435	2	0.5
Children's Hospital Colorado	Aurora	99	1	1.0	194	0	0
Davita Alamosa Dialysis	Alamosa	541	2	0.4	675	11	1.6
Davita Arvada Dialysis	Arvada	366	1	0.3	376	8	2.1
Davita Aurora Dialysis	Aurora	1,478	5	0.3	1,551	14	0.9
Davita Belcaro Dialysis	Denver	698	4	0.6	646	16	2.5
Davita Black Canyon Dialysis	Montrose	191	1	0.5	260	6	2.3
Davita Boulder Dialysis	Boulder	280	1	0.4	280	4	1.4
Davita Brighton Dialysis	Brighton	562	0	0	521	10	1.9
Davita Commerce City Dialysis	Commerce City	627	4	0.6	627	8	1.3
Davita Cortez Dialysis	Cortez	801	3	0.4	695	5	0.7
Davita Denver Dialysis	Denver	825	7	0.8	817	29	3.5
Davita Durango Dialysis	Durango	342	6	1.8	368	15	4.1
Davita East Aurora Dialysis	Aurora	1,280	13	1.0	1,149	18	1.6
Davita Englewood Dialysis	Englewood	590	0	0	539	11	2.0
Davita Fountain Dialysis	Fountain	407	3	0.7	431	5	1.2
Davita Grand Junction	Grand Junction	715	14	2.0	745	15	2.0
Davita Lakewood Crossing	Lakewood	1,225	11	0.9	1,040	21	2.0
Davita Lakewood Dialysis	Lakewood	1,051	8	0.8	1,024	24	2.3
Davita Littleton Dialysis	Littleton	883	3	0.3	718	9	1.3
Davita Lone tree-Skyridge	Lone tree	471	3	0.6	354	1	0.3
Davita Longmont Dialysis	Longmont	314	7	2.2	256	4	1.6
Davita Lowry Dialysis	Lowry	1,066	1	0.1	1,023	11	1.1
Davita Mesa County Dialysis	Grand Junction	225	0	0	303	6	2.0
Davita North Colorado Springs Dialysis	Colorado Springs	140	3	2.1	142	0	0
Davita North Metro Dialysis	Westminster	400	4	1.0	383	7	1.8
Davita Northeastern Colorado Dialysis	Sterling	368	0	0	412	7	1.7
DaVita Parker Dialysis	Parker	325	0	0	377	13	3.4
Davita Pikes Peak Dialysis	Colorado Springs	1,022	6	0.6	1,004	10	1.0

Dialysis-Related Infections: Local Access Infections: August 1, 2011 – July 31, 2013							
Dialysis Center and City		August 2011- July 2012			August 2012- July 2013		
		# of Patients	Infection Count	Rate	# of Patients	Infection Count	Rate
Davita Printers Place Dialysis	Colorado Springs	196	1	0.5	195	2	1.0
Davita Red Hawk Dialysis	Castle Rock	8	***	***	77	1	1.3
Davita Sable Dialysis	Aurora	Not yet operating			418	9	2.2
Davita South Denver Dialysis	Denver	746	2	0.3	618	11	1.8
Davita Southwest Denver Dialysis	Denver	84	2	2.4	270	6	2.2
Davita Thornton Dialysis	Thornton	982	5	0.5	824	9	1.1
DaVita Westminster Dialysis	Westminster	700	2	0.3	531	11	2.1
Denver Women's Correctional Center	Denver	285	0	0	120	Events Not Reported	
Dialysis Clinic Inc. Grand Junction	Grand Junction	175	2	1.1	252	1	0.4
Dialysis Clinic Inc. Montrose	Montrose	381	1	0.3	399	7	1.8
FMC Canon City	Canon City	409	1	0.2	430	2	0.5
FMC Denver Central Dialysis	Denver	1,246	34	2.7	1,156	18	1.6
FMC East Denver	Aurora	1,241	16	1.3	1,200	7	0.6
FMC Fort Collins Dialysis	Fort Collins	973	21	2.2	893	17	1.9
FMC Greeley	Greeley	1,365	3	0.2	1,405	12	0.9
FMC La Junta	La Junta	427	1	0.2	453	1	0.2
FMC Lamar	Lamar	271	6	2.2	280	0	0
FMC Loveland Dialysis	Loveland	719	16	2.2	653	10	1.5
FMC Pavilion	Denver	Not yet operating			184	1	0.1
FMC Pueblo	Pueblo	734	5	0.7	709	11	1.6
FMC Pueblo South	Pueblo	923	12	1.3	1,012	7	0.7
FMC Pueblo West Dialysis	Pueblo	290	1	0.3	277	2	0.7
FMC Rocky Mountain Dialysis	Denver	1,085	26	2.4	1,010	11	1.1
FMC Stapleton Dialysis	Denver	527	3	0.6	522	3	0.6
FMC Walsenburg	Walsenburg	147	0	0	158	2	1.3
FMC West Hampden	Englewood	Not yet operating			26	***	***
Liberty Dialysis - Castle Rock	Castle Rock	132	0	0	135	2	1.5
Liberty Dialysis Colorado Springs Central	Colorado Springs	1,132	2	0.2	1,120	15	1.3
Liberty Dialysis Colorado Springs North	Colorado Springs	460	1	0.2	457	0	0
Liberty Dialysis Colorado Springs South	Colorado Springs	570	0	0	677	0	0
Liberty Dialysis Pueblo	Pueblo	536	4	0.7	500	5	1
Reliant Renal Care - Colorado Springs	Colorado Springs	170	5	2.9	60	0	0
Reliant Renal Care - Trinidad	Trinidad	156	0	0	64	1	1.6
University Of Colorado Hospital Chronic Dialysis Unit	Denver	389	1	0.3	299	1	0.3

Note: AR=American Renal, FMC=Fresenius Medical Care. Dialysis infection rates are per 100 patient months. National comparison based on data collected and reported by NHSN from Jan-Dec 2006.

CONCLUSIONS

Colorado mandated reporting of HAI in 2006. To date, seven annual reports have been submitted to the legislature and public demonstrating a commitment by the Colorado Department of Public Health and Environment and infection prevention professionals to track, monitor and report HAI data. Constant attention is needed to ensure patient safety in all types of health care facilities. Any success in reducing these serious infections will require continued effort from multiple stakeholders including patients and their families, care providers, administrators and state health departments.

Key findings described in this report include the following:

- Most Colorado health facilities had HAI rates similar to national rates.
- Statewide aggregate SSI rates for colon surgeries and abdominal hysterectomies done in hospitals were better than national rates.
- Statewide aggregate SSI rates for hernia repairs performed in ambulatory surgery centers have been better than national rates for the last three years.
- Breast surgeries performed in hospitals had worse SSI rates when compared to the nation.
- Ambulatory surgery centers traditionally report fewer infections than hospitals, likely due to reduced opportunity to conduct post surgical follow-up with patients and surgeons.
- Statewide aggregate CLABSI rates in adult critical care units were better than the national average. CLABSI rates for long-term acute care hospitals, rehabilitation hospitals and neonatal critical care units remained steady and were similar to national rates.
- Statewide, Colorado's aggregate dialysis access related bloodstream infection rates have been better than the national average for the last three reporting years.

While this report only includes information on a subset of HAIs, the information provided can be used as an important indicator of health care quality and infection prevention efforts in Colorado facilities. Beyond the number and rate of HAI for each facility, consumers can see the volume of procedures performed at each facility, which can be an indicator of experience and practice.

Users of this report should note that the data presented are self-reported by each facility and that data validation studies only have been completed thus far for selected CLABSI, SSI and DRI. It is recommended that conclusions regarding health care quality be made in conjunction with other quality indicators and that consumers consult with doctors, health care facilities, health insurance carriers, health care websites from reputable sources (e.g., Hospital Compare, Colorado Hospital Report Card, or Leap Frog), and their families and friends before deciding where to receive care.

The department's Health and Safety Data Services Section will continue its work to reduce HAI in Colorado through various activities, including the tracking and publishing of HAI data, completion of HAI data validation studies, implementation of HAI prevention collaboratives, maintenance of communication vehicles for HAI related information and collaboration with internal and external partners committed to patient safety.

It is hoped that facilities will use the data in this report to target and improve infection prevention efforts and that consumers will use these data to make more informed health care decisions.

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APPENDICES

APPENDIX A: HAI DATA VALIDATION STUDIES AND PREVENTION PROJECTS

DATA VALIDATION STUDIES

As part of a comprehensive reform to address HAI, many states, including Colorado, have mandated reporting to create greater transparency between health care facilities and the public while supporting greater accountability. According to Lin⁹, inter-facility comparisons of the data are only valid when the methods of surveillance are uniform and reliable across institutions. The Health and Safety Data Services Section has conducted three validation studies to date: CLABSI, hernia and dialysis events. A fourth validation study for hip/knee procedures is currently underway.

Central Line Associated Bloodstream Infection (CLABSI)

A CLABSI data validation study was completed in May, 2011. Two trained reviewers conducted interviews with infection preventionists and performed retrospective medical record reviews in 43 hospitals. The medical records were randomly chosen from patients with positive blood cultures who received treatment during Jan. 1, 2010 – March 31, 2010, in one or more of the reporting locations (adult and neonatal critical care, long term acute care hospital), and who either had a central line at the time of the infection or had a central line removed within 48 hours of the onset of the infection. The results demonstrated a need for education of the infection preventionists to clarify surveillance definitions and rules as well as surveillance practices.

Hernia Surgery Infections

A SSI data validation study was completed in 2012. The objectives were to learn how facilities conduct post-discharge surveillance following surgery, assess the accuracy of data reported for risk adjustment, and assess accuracy in which facility staff applied NHSN definitions and criteria. Forty-one facilities were visited (31 hospitals and 10 ambulatory surgery centers) to perform chart review of hernia procedures and infections reported through NHSN from the time period January through June 2010.

Dialysis Infections

In 2012, a validation study to assess underreporting of dialysis event data was conducted. Of 65 operating dialysis treatment centers (DTC) in Colorado, 25 were visited to perform patient chart reviews to identify non- and over-reported events. Of 467 charts reviewed in 25 facilities, 29 percent of events were found to be unreported while 13 percent of reported events were not reportable.

PREVENTION COLLABORATIVES

Surgical Site Infections and *Clostridium difficile* Infections

During 2010-2011, the Colorado Department of Public Health and Environment partnered with the Colorado Hospital Association (CHA) and Denver Health Medical Center to implement two HAI prevention collaboratives for surgical site infections (SSI) and *Clostridium difficile* infection (CDI). Seventeen and 16 facilities, respectively, participated in the SSI and CDI collaboratives. Participants piloted and implemented new HAI prevention strategies, engaged additional hospital staff (i.e.,

physicians, environmental services) and shared data—all in the effort to achieve the following HAI reduction goals:

- ≥ 15 percent reduction in the SSI rate from baseline
- ≥ 15 percent reduction in CDI rates from baseline
- ≥ 90-95 percent adherence rates to process measures (dependent upon metric)

The following targets were achieved:

- Most hospitals maintained at least 90 percent adherence to CDI process measures
- CDI Hospital Onset (HO) rates declined by 14 percent,
- Community Onset-Hospital Associated (CO-HA) CDI rates declined by 24 percent
- Combined HO/CO-HA CDI rates reduced by 17 percent
- Most facilities remained at 95 percent adherence to SSI process measures
- Some facilities for certain surgeries reduced their SIR from 2009 to 2010 by ≥ 10 percent
- Most facilities showed a decline in SSI of at least 15 percent in 2011

Dialysis Infections

In 2011-2012, the Colorado Department of Public Health and Environment partnered with the Intermountain End Stage Renal Disease Network to implement a Dialysis Infection Prevention Collaborative. Representatives from 30 outpatient dialysis treatment centers (DTC) across Colorado implemented interventions to improve hand hygiene (HH), conducted observations of HH practices, submitted results of HH audits and continued to submit dialysis event data into NHSN. Results showed declines in access-related bloodstream infections for both collaborative and non-collaborative facilities, and a decline in local access infections for collaborative facilities only.

Dialysis Patient Education

For 2012-2013, the department received federal funding to implement a Dialysis Patient Education Collaborative that will develop a standardized curriculum of education that includes key steps in infection prevention, vascular access and general patient care. The education is intended to engage patients in their own care by teaching observation and communication methods that empower them to observe staff technique, ask questions and provide feedback.

SPECIAL PROJECTS

Hand Hygiene Partnership

According to the Centers for Disease Control and Prevention (CDC), hand hygiene is the most important measure to prevent the transmission of harmful germs. Studies show that ***health care workers follow hand hygiene guidelines only about 40 percent of the time.***

The Health and Safety Data Services Section partnered with Disease Control and Environmental Epidemiology of the Colorado Department of Public Health and Environment along with the Colorado Foundation for Medical Care and the Colorado Hospital Association to develop and distribute a new hand hygiene improvement toolkit for providers in a variety of health care settings including nursing homes, hospitals, ambulatory surgery centers, home health, physician offices and clinics.¹⁰⁻¹³

APPENDIX B: STANDARDIZED INFECTION RATIO OVERVIEW

The Standardized Infection Ratio (SIR) is a risk adjusted summary measure used for central line associated bloodstream infection (CLABSI) data, umbilical catheter associated infection (UCABI – Neonatal Critical Care Units only), Surgical Site Infection (SSI) data and dialysis-related infection (DRI) data. The SIR describes a facility's performance, taking into account individual facility's patient population risk. The SIR is the number of infections reported by the facility divided by the expected number of infections. The expected number of infections is determined by historical data collected by the NHSN as well as an individual facility's patient population. See example calculations below.

CLABSI in adult critical care units and long-term acute care hospitals

CLABSI in neonatal critical care units

SSI in hospitals and ambulatory surgery centers (hernia procedures only)

SSI in ambulatory surgery centers (hip and knee replacement procedures)

DRI in dialysis centers

Interpretation of the SIR is done by comparing a facility's value to 1.0 (observed and expected number of SSI are the same). In other words, the number of infections is what was expected based on the national average. If the SIR value is greater than 1.0, there are more infections than expected, and if the SIR value is less than 1.0, there are fewer infections than expected.

The statistical significance of the difference between the observed and expected SSI based on the national average is tested using a Poisson test. A p-value is computed from the test and helps to determine if the difference in the HAI rate is due to chance alone. If the p-value is greater than or equal to 0.05, then there is no significant difference (**SAME**) between the facility's HAI count and the expected count based on the national rate.

If the p-value is less than 0.05, then the difference is statistically significant, and the value of the SIR determines whether the facility is better than or worse than the national average. If the SIR is greater than 1.0, then the facility has significantly more CLABSI than were expected based on the national average (**WORSE**). The converse also applies where if the SIR is less than 1.0, the hospital has significantly fewer CLABSI than were expected (**BETTER**).

APPENDIX C: GLOSSARY OF TERMS AND ABBREVIATIONS

Access-related Bloodstream Infection (ARB): The presence of bacteria in the blood verified by culture with the source identified as the vascular access site or is unknown.

Ambulatory Surgery Center (ASC): A facility which operates exclusively for the purpose of providing surgical services to patients not requiring hospitalization.

Bloodstream Infection (BSI): An infection of the blood.

Central Line (CL): A flexible tube (intravascular catheter) that terminates at or close to the heart or in one of the great vessels.

Central Line-Associated Bloodstream Infection (CLABSI): A primary bloodstream infection (BSI) in a patient that had a central line within the 48-hour period before the development of the BSI.

Central Line-Associated Bloodstream Infection (CLABSI) Rate: The total number of central line-associated bloodstream infections divided by the number of central line days multiplied by 1,000.

Central Line Days (Device Days): A daily count of patients with a central line in place is performed at the same time each day.

Coronary Artery Bypass Graft Surgery (CBGB): A surgical treatment for heart disease in which a vein or artery from another part of the body is used to create an alternate path for blood to flow to the heart bypassing a blocked artery.

Critical Care Unit (CCU): A nursing care area that provides intensive observation, diagnosis, and therapeutic procedures for adults and/or children who are critically ill.

Dialysis Event (DE): An event for a dialysis patient involving any one of three possible scenarios: 1) hospitalization; 2) intravenous (IV) antimicrobial start; or 3) a positive blood culture. Dialysis event reporting involves *outpatient* facilities only.

Fascia: A thin layer of connective tissue covering, supporting, or connecting the muscles or inner organs of the body.

Great Vessel: Based on NHSN criteria for reporting central line BSI, the following are considered great vessels: aorta, pulmonary artery, superior vena cava, inferior vena cava, brachiocephalic veins, internal jugular veins, subclavian veins, external iliac veins, common iliac veins, common femoral veins, and in neonates, the umbilical artery and vein.

Health Facility Acquired Infection or Health Care-Associated Infection (HAI): An infection of a patient that occurs in a health care setting which was not present or incubating at the time of admission and is not related to a previous admission.

Hip Replacement Surgery: An elective procedure for people with severe hip damage or pain related to chronic osteoarthritis, rheumatoid arthritis or other degenerative processes involving the hip joint.

Implant: A nonhuman-derived object, material, or tissue that is permanently placed in a patient during an operation. Examples include: heart valves, metal rods, mesh, wires, screws, cements, hip replacements and other devices.

Infection: An invasion of the body tissues by an infectious agent.

Infection Preventionist (IP): A health professional that has special training in infection prevention and monitoring.

Inpatient: A patient whose date of admission to a health care facility and the date of discharge are different calendar days.

IV Antimicrobial Start: The first dose of a medication given intravenously to kill microscopic infectious organisms such as bacteria and viruses in the body.

Knee Replacement Surgery (arthroplasty): An elective procedure for people with severe knee damage and pain related to osteoarthritis, rheumatoid arthritis, and traumatic arthritis.

Local Access Infection (LAI): Pus, redness, or swelling of the vascular access site without the presence of access-associated bacteremia, patient hospitalization, or initiation of an IV antimicrobial agent.

Location of Attribution: The inpatient location where the patient was assigned on the date of the bloodstream infection (BSI) event, which is further defined as the date when the first clinical evidence appeared or the date the specimen used to meet the BSI criteria was collected, whichever came first.

Long-Term Acute Care Hospital (LTAC): A specialty care hospital that cares for patients with serious medical conditions that require intense, special treatment for long periods of time (an average length of stay is 25 days).

Metric: A measurement for calculating health outcomes. There are both process metrics that measure adherence to standard health care quality processes, and outcome metrics that measure the number of patients affected by specific medical treatments.

National Health Care Safety Network (NHSN): NHSN is a secure, internet-based surveillance (monitoring and reporting) system managed by the Centers for Disease Control and Prevention (CDC) Division of Health care Quality Promotion

NHSN Operative Procedure: A procedure that meets the following criteria: 1) performed on a patient who is a NHSN inpatient or outpatient; 2) takes place during an operation; and 3) included in the NHSN operative procedure categories.

Neonate: An infant less than or up to 30 days of age.

Neonatal Critical Care Unit (NCCU): Patient care area providing care to most critically ill infants.

Outpatient: Patient whose date of admission to the facility and date of discharge are the same day.

Patient Days: The total number of inpatients for a particular unit determined at the same time each day for every day of the month recorded as a total sum for the month.

Permanent Central Line: A catheter that is tunneled under the skin on the chest wall and includes certain dialysis catheters (e.g., Hickman, Groshong, and Broviac) and implantable venous access ports (e.g., Port-a-Cath). Some dialysis patients may still have a port used for dialysis; however, most dialysis patients do not use this type of access due to the increased risk of infection. Ports are frequently used for administration of chemotherapeutic agents.

Population: The total number of inhabitants of a geographic area or the total number of persons in a particular group (e.g., the number of persons engaged in a certain occupation).

Prevalence: The number or proportion of cases, events or attributes among a given population.

Rate: An expression of the relative frequency with which an event occurs among a defined population and specific time period calculated as the number of new cases or deaths during a specified period divided by either person-time or the average (mid-interval) population.

Risk: The probability that an adverse event will occur (e.g., that a person will be affected by, or die from, an illness, injury, or other health condition within a specified time or age span).

Risk Adjustment: Accounts for differences in patient populations, enabling comparisons between hospitals.

Risk-Adjusted Rate: For surgical site infections, the risk-adjusted rate is based on a comparison of the actual (observed) rate and the expected rate if nationwide the patients had the same distribution of risk factors as the hospital. For CLABSI, the adjusted rate is a comparison of the actual rate and the expected rate based on national rates for each ICU or within birth weight categories for neonates.

Risk Factor: An aspect of personal behavior or lifestyle, an environmental exposure, or a hereditary characteristic that is associated with an increase in the occurrence of a particular disease, injury, or other health condition.

Standardized Infection Ratio (SIR): A risk adjusted summary measure that accounts for the type of procedure and risk category. The SIR provides an overall score for a procedure at each health facility based on the expected number of infections after adjusting for the risk category.

Surgical Site Infections (SSI): Infections that are directly related to an operative procedure. Some SSI are minor and only involve the skin or subcutaneous tissue. Other SSI may be deeper and more serious.

Surgical Site Infection Rate: Surgical site infection rates per 100 operative procedures are found by dividing the number of SSI by the total number of specific operative procedures within a given reporting period. The results are then multiplied by 100. These calculations are performed separately for each type of surgical procedure. They are listed by risk level.

Symptom: Any indication of disease noticed or felt by a patient.

Temporary Central Line: A central line that is not tunneled.

The Department: The Colorado Department of Public Health and Environment (CDPHE).

Trend: Movement or change in frequency over time, usually upwards or downwards.

Validation: A method of assessing the completeness and accuracy of reported HAI data.

Vascular Access Infection: An infection that is either a local access infection or access-related bloodstream infection.

Wound Class: An assessment of the likelihood and degree of contamination of a surgical wound at the time of the operation. Wounds are divided into four classes: clean, clean-contaminated, contaminated, and dirty.